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COMPUTERWORLD

INSIDE

Spotlight — DEC's emphasis on vertical industries spurs development of special-purpose software. Center pullout section.

In Depth — Go comparison shopping for a 9370. **Page 61.**

Early OS/2 called slow but useful

BY ED SCANNELL
CW STAFF

Software vendors last week said the developers' version of Microsoft Corp.'s MS OS/2 operating system needs speed and performance enhancements before they can begin full-scale development.

Most of the developers, who have already received beta-test versions of the future IBM Personal System/2 operating system, said they had expected the initial release's code to be bulky and slow in some areas but that many of the necessary performance improvements can be accomplished almost routinely.

They said that they can live with the program's deficiencies until the next revision is available.

"I am willing to accept that there will be some areas, like I/O, that aren't as tight as [MS- or PC-] DOS, but at the same time, there are things like screen performance that are better than DOS," said Bob Frankston, chief scientist for Lotus Development Corp.

'Full of bugs, holes'

However, one major developer who has had a copy of MS OS/2 for almost two months, said the program is not yet acceptable for serious development. "The copy we have is so full of bugs and holes that it's not worth our time to do any more work on it," he said. "We've suspended all work until we get a decent copy."

Only one developer among a half-dozen who were questioned last week found the program's condition unacceptable. The majority centered their complaints on the program's massive 1.5M bytes of code and its compatibility box, which runs applications that are compatible with IBM's

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Users expecting high-end 4381

BY STANLEY GIBSON
CW STAFF

Several users last week indicated they expect IBM to unveil a new high-end 4381 mainframe soon. The processor is believed to fill a performance gap between the current 4381 Model 14 and the 3090 Model 150E.

One large user, when considering whether to lease a 4381 from IBM or from an independent leasing company, said he was advised by IBM to defer his decision until after a major announcement scheduled to be made May 19.

Another 4381 user, Bob Smith, data center manager for Rosemount, Inc. in Eden Prairie, Minn., said several users he knows have advised him that two larger models of the 4381 will be introduced. The lower model would offer a 20% to 25% improvement over the largest 4381 now available. The speed improvement would come from faster microprocessors, and current 4381s could be field-upgraded by adding the chips, he indicated. However, he could not suggest a time frame for the enhancement.

When queried about possible impending announcements, an IBM spokesman reiterated the industry giant's policy against commenting on products that

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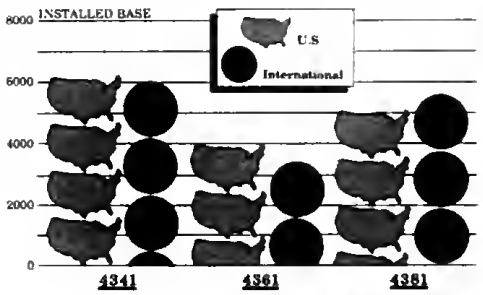
Family growth expected

Installed base of IBM 4300 series, as of year-end 1986, would be target of more powerful system



INFORMATION PROVIDED BY INTERNATIONAL DATA CORP
CW CHART: MITCHELL J. HAYES

NEC moves in on U.S. super market

BY JAMES CONNOLLY
CW STAFF

SANTA CLARA, Calif. — The joint venture formed six months ago by Honeywell, Inc. and NEC Corp. to market Japanese supercomputers in North America made its first product introduction last week with enhanced models of NEC's SX series.

The announcement is tied to an attempt by NEC to forge ahead in a U.S. market in which NEC claims the only Japanese-made U.S. supercomputer sale. It was made at a time when Congress is talking tough about tariffs on Japanese imports although the chairman of Honeywell-NEC Supercomputers, Inc. said his company does not stand to be hurt by those tariffs.

Honeywell-NEC made its public debut at the International Conference on Supercomputing and World Supercomputer Exhibition here. The company said it is offering three SX-2 models, each with a 6-nsec cycle time and support for 8G bytes of extended memory, which is four times the SX series' previous capacity. The new models also feature upgrade capabilities previously unavailable on the series when it was offered only by NEC.

The new models are the SX-2-100, the SX-2-200 and the SX-2-400, which was previously known as the SX-2 and installed at the company's only U.S. customer site — the Houston Area Research Center in Texas. The three models range in price from $7 million for the SX-2-100

Continued on page 12

'And now, a word from . . .'

Computer firms pitch execs with TV appeal

BY CLINTON WILDER
CW STAFF

You're relaxing at home in the evening, watching Bill Cosby, Dan Rather or Larry Bird. Do you sit up and take notice when your television is suddenly filled with talk about systems integration, real-time communications and SNA networks?

Wang Laboratories, Inc. believes that you do. At a time when its bottom line is less than robust, Wang is investing huge sums of money to take advantage of your attention.

For many leading computer vendors, the enigmatic world of television advertising has become an important vehicle for their messages to corporate America — especially the growing number of nontechnical executives taking an interest in the computers their companies are using. "TV is a very inappropriate medium for the DP/MIS audience alone," said James Dennis, Hewlett-Packard Co.'s marketing communications manager for business computing systems. "But we are reaching 25 million to 30 million professional managers and business owners who are involved in some way in the decision to purchase a computer. We think it's equally important to talk to all the people involved with the decision, not just those who implement the technologies."

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NEWSPAPER

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IN THIS ISSUE

PC progress. Micro Tempus software converts IBM VTAM hosts into PC network file servers. Wang ships unannounced 80286 and 80386-based micros to certain customers. DG ups capacity of its IBM PC-compatible laptop 512K to 25M bytes. Wyse also rolls out three modular 80286-based PCs. Pages 10, 13, 14, 15.

Quotable

"You'll know when your marketing department gets a Mac because you'll start getting memos written in 14 different fonts and sizes."

AARON GOLDBERG
INTERNATIONAL DATA CORP.
VICE PRESIDENT

Extended OS/2 called unfair IBM bundling

BY CHARLES BABCOCK
CW STAFF

An independent software company official has charged that IBM's advanced personal computer operating system bundles software products together, excluding third-party suppliers in an "unfair competitive practice."

Martin A. Goetz, senior vice-president of Applied Data Research, Inc. (ADR) in Princeton, N.J., has called on ADAPSO, the organization of software and services companies, to bring his charge to the attention of IBM Chairman John Akers and government agencies, including the U.S. Department of Justice and the Federal Trade Commission.

The target of Goetz's charge is the Extended Edition of the Personal System/2's operating system. In its April 2 announcement, IBM said OS/2 Extended Edition will have a relational data base management system and communications manager built into the operating system.

'No technical need'

"I have talked to technical people at IBM, and they say there was no technical need to do it. It was a marketing issue," Goetz said from Amsterdam, Holland, where he was attending an ADR users group meeting last week.

IBM spokesmen at its Entry Systems Division in Montvale, N.J., were not able to comment last week.

Stuart Miller, president of Software AG of North America, Inc. in Reston, Va., said he agreed that including the DBMS and a communications manager in an operating system constituted bundling by IBM and said "I reject that entirely."

Roy E. Folk, executive vice-president for Ashton-Tate, a micro DBMS vendor, said his firm had asked attorneys to review the Extended Edition bundling issue and concluded the "software is being charged for, not bundled and given away with the hardware." He added that bundling charges will be difficult to make stick because IBM is also offering a basic version of the operating system for $395 vs. $795 for the Extended Edition, leaving purchasers a choice.

Goetz said both the communications manager and DBMS will duplicate existing third-party products. Including these products in the operating system "will eliminate many data base and communications software companies from being able to compete at the PC-user level," Goetz said in his April 15 letter to Jay Goldberg, president of ADAPSO.

The letter charged that embedding the two products in the operating system gave IBM the competitive advantage of being perceived as better able to provide networking and distributed processing across systems. At the same time, other suppliers would not be able to provide the "tight integration" required for maximum performance, because their products would have to work on top of the operating system, the letter said.

Martin A. Goetz

Although IBM announced the operating system on April 2, the firm declined to say when it would become available. The company said it would announce availability in the fourth quarter of this year, prompting a charge by Goetz that IBM was "preannouncing" products that were one year to 18 months away in order "to freeze the market for PC operating systems."

ADR does not offer a PC DBMS today, but has a relational product under development that will be offered within a year, along with a soon-to-be announced fourth-generation language with a built-in data base system.

Goetz said he believes IBM should sell its PS/2 relational DBMS as a separate product in competition with other products "the way it sells DB2," its mainframe DBMS. He added that the Extended Edition operating system could set a precedent that IBM would like to duplicate at the mainframe level.

George W. Tamke, president of Cullinet Software, Inc. in Westwood, Mass., said he agreed that the practice of bundling constitutes unfair trade, but said he needed to know more about the combination represented by Extended Edition to classify it as such.

Goetz was an early critic of bundling in the 1960s, when IBM included the operating system and other software as part of a hardware sale. He said the practice inhibited companies like ADR from selling their products to IBM customers.

"IBM shouldn't be in an advantageous position just because they control the operating system," Goetz asserted.

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Apollo to roll out 3.5 MIPS unit

Claims DN590 Turbo bests Silicon Graphics in 3-D workstation market

BY SINAMARY BUBA MAGINNIS
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc. is expected to announce today the DN590 Turbo, a real-time, three-dimensional color graphics workstation designed to challenge heavyweight competitor Silicon Graphics, Inc.

The DN590 high-performance workstation will be based on the Motorola, Inc. 68020 microprocessor and 68881 floating-point coprocessor, the same chips built into Apollo's current high-end graphics workstation, the DN580 Turbo, according to information obtained by *Computerworld*.

Although the new workstation will reportedly share the DN580's computational specifications, system enhancements such as new graphics software, pipelines to improve applications throughput and new disk technology are said to significantly improve CPU performance.

DN590 achieves 3.5 MIPS

The DN580, for example, achieves benchmarks of 2 million instructions per second (MIPS), while the DN590 has garnered a 3.5 MIPS ranking, according to a source close to Apollo.

The DN590 will reportedly be able to display 16.7 million colors. Mountain View, Calif.-based Silicon Graphics' Iris 4D/64 superworkstation's red-blue-green 24-bit mode enables the display of 16.7 million colors, while the the Iris 12-bit color-map mode provides for 4,096 displayable colors.

Apollo's high-end graphics workstation is aimed at 3-D solids modeling for applications such as product styling, computer animation, image processing, mechanical computer-aided engineering design, molecular modeling and some robotics.

The vendor is also expected to reduce the DN570 and DN580 Turbo prices while offering system enhancements for the DN500 workstation family, sources said. DN500 workstations will be repackaged and fine-tuned to run specific applications such as 3-D solid modeling, 3-D wire frame and 2-D solid modeling, sources said. The current price for the DN580 Turbo configured with 8M bytes of memory is $53,900.

The DN590 is set to be priced in the $50,000 to $60,000 range and will be completely compatible with the current product line, including the recently announced IEEE 802.3 Ethernet local-area network and support for other upcoming standard networking environments.

Workstation options include a choice of Apollo's proprietary Aegis operating system and the highest releases of both AT&T's Unix System V and the University of California at Berkeley's Unix 4.2.

Apollo is also expected to unveil a family of high-performance network servers that can be configured to off-load workstations of compute-intensive tasks, work as file servers or link with communications devices.

The impending DN590 announcement is a counter to niche workstation suppliers, notably Silicon Graphics, and a strategic move to stem growth of competitors such as Hewlett-Packard Co. and Sun Microsystems, Inc., according to industry observers.

Both Sun and Apollo are expected to introduce reduced instruction set computing (RISC)-based workstations early in 1988, reported Robert G. Herwick, a senior analyst for Hambrecht & Quist, Inc. in San Francisco.

Sun also reported last month that approximately $12 million has been invested to develop a high-performance workstation to be announced by year's end, Herwick said. Prime Computer, Inc. is also expected to introduce a high-end workstation within the year, according to Richard A. Shaffer, editor and publisher of the New York-based "Technologic Computer Letter."

"When Apollo first walked into the forest a few years ago, no one had cut down a single tree. Now, there are a lot of other woodsmen out there," Shaffer said. "Silicon Graphics has taken sales Apollo could have had. And Sun is not sitting still, either."

Sun recently surpassed Apollo as the leader in workstation shipments, analysts agree.

Sun grows in CASE niche

Sun's major growth is in the computer-aided software engineering niche, in which monochrome workstations are adequate, said Charles Foundyller, president of Daratech, Inc., a Cambridge, Mass.-based research firm. Apollo, on the other hand, has recorded more sales in the high-end arena, Foundyller said. "Apollo's graphics have traditionally led and surpassed Sun — and are really only behind Silicon Graphics," he noted.

Stellar Computer, Inc., a start-up founded by J. William Poduska, the founder of Apollo, is expected to compete in the high-performance, 3-D graphics workstation market, according to Hambrecht & Quist's Herwick. Stellar's system will most likely be announced next year and go beyond RISC technology with a Complex Instruction Set Computer, marking the trend for faster workstations in the 1990s, Herwick added.

Technologic's Shaffer observed, "If Apollo doesn't act to compete with [Silicon Graphics] and with what Stellar is going to announce, they'll lose the top end of the market they started in the first place."

Workstation comparisons

A look at Apollo's new high end, its DN580 and competition

Workstation	CPU	MIPS*	Floating-Point Coprocessor	True Colors	Pixel Resolution	Base Price
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Apollo DN580 Turbo	**Motorola, Inc. 68020**	**2**	**Motorola, Inc. 68881**	**256 displayable from palette of 16 million**	**1,280 by 1,024**	**(Current price) $53,900**
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

* Millions of instructions per second

CW CHART

Low-cost workstation fray widens

BY SINAMARY BUBA MAGINNIS
CW STAFF

TEMPE, Ariz. — Motorola, Inc.'s Microcomputer Division last week joined the low-cost 32-bit workstation fray with a unit for OEMs priced at less than $11,000.

Motorola's announcement of the VME Delta Series Model 2316 quickly followed Sun Microsystems, Inc.'s move last month to cut the base price of its low-end 3/50 monochrome workstation to $5,000.

"There's very obviously a price elasticity phenomenon going on here," noted Robert G. Herwick, a senior analyst at Hambrecht & Quist, Inc.

The 2 million instructions per second (MIPS) VME Delta Series Model 2316 announcement came within weeks of Motorola's shipment of the VME Delta Series Model 2616. The 2316 workstation is intended to compete with the Digital Equipment Corp. Vaxstation 2000 in the OEM technical computer systems market, according to Motorola. The 2316 operates at twice the MIPS rating of the low-end DEC workstation.

The newest Motorola workstation can operate as a standalone or in work groups with other VME Delta Series systems, the vendor said. The system is based on Motorola's 68020 microprocessor, which is also used by Sun and Apollo Computer, Inc. workstations. The Motorola workstation supports AT&T's Unix System V, Release 3.

The Model 2316 can be configured with up to 4M bytes of memory and up to 160M bytes of disk storage, the vendor said. The new model is scheduled to be available to OEM and systems integrator customers with beta-test sites beginning this month. Volume shipments are slated for July. OEM quantity prices range from $7,000 to $11,000, depending on the configuration.

Motorola's latest offering of a fully configured workstation for less than $11,000 continues the rapid trend toward lower workstation prices, said Richard A. Shaffer, editor and publisher of the New York-based "Technologic Computer Letter." "The Apple Computer, Inc. Macintosh II is clearly a workstation in disguise," he said.

However, Charles Foundyller, president of the Cambridge, Mass.-based Daratech, Inc., contends Motorola will not perform well in the systems market. "It's a very small fraction of the market when compared to Sun, Apollo or Hewlett-Packard Co., who are the leading workstation manufacturers at this point — although IBM will be doing something soon, once it starts shipping its new IBM RT," Foundyller said.

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Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
617/879-0700

Micro Big Three square off for slugfest

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp.'s announcement of a data base product and a 10-year development agreement with IBM puts the spreadsheet colossus into direct conflict with its two biggest competitors, Microsoft Corp. and Ashton-Tate.

Lotus recently lost its coveted position as the No. 1 microcomputer software vendor in revenue to Microsoft. Microsoft's five-year agreement with IBM gives it a virtual franchise on single-user operating systems for IBM personal computers and compatibles.

Microsoft has been branching out into a range of applications software markets and plans to compete with Lotus when it releases its PC Excel integrated spreadsheet product later this year.

Lotus's agreement with IBM put the firm on a more even keel with Microsoft, according to observers. "It smooths out some of the influence that Microsoft has gained," says Fred M. Zickert, manager of personal computers for Eaton Corp. in Cleveland. Lotus's efforts are also aimed at regaining its top revenue position and staying ahead of Ashton-Tate, which has had consistent sales gains based on the strength of its Dbase III data base software.

Stealing market share

The announcement of a Lotus SQL data base product for local-area networks, set to be available sometime next year, is widely viewed as a bold attempt to steal market share away from Ashton-Tate. Although Ashton-Tate owns the lion's share of the personal computer data base market, the advent of IBM's OS/2, a new operating system to be available early next year, gives other vendors a chance to compete.

"Ashton-Tate is under heavy pressure," notes Richard Finkelstein, vice-president of the central region for Codd and Date Consulting Group in Chicago.

The market that Lotus and Ashton-Tate will target is chacterized by file server-based, multiuser data base applications, according to William Shattuck, a software analyst with Montgomery Securities, a San Francisco investment firm. "Nobody has a franchise in the file server-based turf. The market will be highly fragmented," Shattuck explains.

Ashton-Tate is not sitting still, according to Roy Folk, executive vice-president and general manager of the company's Software Products Division.

"We have been driven by our developers for so long that the investment in existing data base application is really key. Lotus has a lot of work cut out for it," Folk says. "We think that we have the users on our side, and this is an area where standards make a difference."

Lotus Chairman Jim P. Manzi disagrees, arguing that Lotus has unique strengths that allow it to compete effectively against all data base competitors. "One element is the quality of the technology; another is the quality of the company and the quality of the relationship any company has with its customers. I'd bet on us in any and all of those categories," Manzi says.

Both firms are staking much of their data base futures on SQL, which has become a hot topic for microcomputer data base vendors. While SQL is essential for micros to efficiently query mainframe data bases, the language is hard to learn and unappealing to many end users.

As a result, both Lotus and Ashton-Tate plan to shield users from SQL syntax. For Ashton-Tate, part of the shielding will come from the Communications Manager that is found in the OS/2 Extended Edition. "You can map pure Dbase III Plus commands into the communications package from IBM and turn them into SQL commands. That is the most important use of SQL in this new world," Folk says. While offering few details, Lotus officials claim its users will not have to know how to use the language.

Ashton-Tate also plans to protect its Dbase programming language through enhancements. "The only way to protect the language is to stay ahead of the power curve of user needs. We are at risk there with respect to some of the high-perfnrmance compilers that exist today," Folk says. It is unclear what type of programming language Lotus will use with its data base products.

Users can decide the fate of any software company. Because few Lotus product details are available, most users have adopted a wait-and-see attitude. "The concept of using the same format that people are familiar with has much merit," Eaton's Zickert says about Lotus's planned 1-2-3 style interface for Lotus/DBMS.

While some Dbase users are reluctant to change, the quality of the relative products will determine which gets the nod. "These products are all in their relative infancy. It is not like Cobol," says Arthur Boyajian, assistant vice-president for Metropolitan Life Insurance Co. in New York. "But the people who work with Dbase like it, so that won't be easy for Lotus to overcome. They have an uphill fight."

Factories work around MAP

Lengthy wait eased by using proprietary products for immediate needs

BY ELISABETH HORWITT
CW STAFF

The prospect of a full-function Manufacturing Automation Protocol (MAP) standard a year or two down the road has not deterred leading companies from installing proprietary systems to fulfill their immediate networking needs.

A number of firms — with General Motors Corp. in the lead — are gearing up for corporatewide MAP installations by implementing early versions of the standard in pilot projects and applications software interfaces.

But GM's aggressive MAP drive aside, many of those same companies see no reason why they should not install proprietary products in the meantime to meet networking needs that will not wait for MAP to reach maturity. The question then becomes whether the advantages of MAP outweigh the cost of conversion.

Pratt & Whitney Canada, Inc., for example, is in the throes of a project to develop a standardized software interface that would permit applications to be ported across the company's diverse installed base of shop floor devices. The software performs the same basic job as the MAP application interface specification, RS-511, which is still under development.

"We wanted to position ourselves so that we can take advantage of MAP with minimal adaptation and conversion," said David Cyr, supervisor of technology planning at Pratt & Whitney. "So we researched what the MAP interface would be from the application program point of view and built it into our application software so that it can make MAP calls."

Unsure of switch

The gas turbine engine manufacturer is still unsure, however, how easy it will be to convert its own software to MAP if and when RS-511 is finalized. "So the question is whether we will redo the project," Cyr said. "Once our interface is up and running, MAP would have to offer a lot of benefits to justify a switch."

For Pratt & Whitney, standardization through either MAP or its own in-house software promises the freedom to add new computer numerical controllers (CNC) to its shop floor network without having to write a whole new device driver each time — a six-month task under the present system, according to Cyr.

The company currently uses Digital Equipment Corp.'s Baseway shop floor control system, which supports several different vendors' Programmable Logic Controller (PLC) and CNCs. However, Pratt & Whitney happened not to choose from among the CNCs that Baseway supports, which forced the firm to write unique device drivers.

"If both DEC and the CNC manufacturers supported MAP fully, there would be no requirement for writing these drivers," Cyr noted. "That's one of MAP's attractions. However, it's unclear at this point what portions of Baseway would remain once this happened."

DEC intends to migrate Baseway to MAP and the RS-511 interface, according to Donald Jenkins, a DEC computer-integrated manufacturing product marketing manager. Decnet migration to MAP — vs. peaceful but noncommunicative coexistence of Decnet and MAP installations — remains an issue for many of the companies interviewed by *Computerworld* and was the focus of a survey by Salem, Mass., firm Advanced Manufacturing Research (see chart).

"The biggest strategy we're applying right now is to stall," commented Dan Miklovic, systems technology manager for Weyerhaeuser Co. information systems. "We do whatever minimum-cost installations [needed] today to get the job done and plan for full-blown MAP and TOP product implementation in 1988." Technical Office Protocol (TOP) is a business-oriented subset of the Open Systems Interconnect (OSI) networking standard, just as MAP is an OSI subset that was designed for the factory environment.

Meanwhile, some dozen plants at Weyerhaeuser are networked on Decnet in combination with other proprietary communications systems such as Allen-Bradley Co.'s Data Highway, Miklovic said.

However, the company decided that it needed a consistent standard to link corporate systems from Hewlett-Packard Co., IBM and DEC as well as factory floor systems. Weyerhaeuser considered Decnet but ran up against a cost barrier, Miklovic explained. "DEC charges three arms and two legs for IBM connectivity," he said.

A cost study on DEC's gateway to IBM's Systems Network Architecture (SNA) performed by Miklovic's people found that it would cost approximately $50,000 to install the necessary software on a DEC VAX.

Weyerhaeuser has thus chosen to wait 18 months for a mature MAP Version 3.0 solution to connect its hosts. That solution, Miklovic pointed out, involves software on both the DEC and IBM host, so it is not centered around DEC systems as Decnet is. "And it still costs $50,000 but now, if we want to add an HP connection, it only costs another $20,000," he said.

DEC would provide an HP gateway — for yet another $50,000, he said. And while DEC's SNA gateway provides "full transparent program-to-program communication," its HP solution only provides primitive file transfer. "Even MAP 2.1 gives you that," Miklovic noted.

And just as Pratt & Whitney's Cyr suggested that MAP would replace Baseway, Miklovic questioned whether there really is any functional difference between a "fully OSI-compliant Decnet" and any other OSI-compliant network — except for network management capabilities that currently exist in Decnet but not in OSI.

DEC's Jenkins asserted that his firm is determined to make its own networking products MAP and TOP compliant but also "provide functionality beyond the standard, either for our own systems or for other vendors' systems — it depends on how creative we are." As of now, however, "In order to take the most advantage of Decnet, you need mostly DEC systems," he stated.

MAP a remote possibility

For companies that can get along with just DEC and perhaps one or two more factory automation vendors, Decnet and other proprietary solutions are more than adequate, and MAP is a remote possibility at best.

Kellogg Salada Canada, Inc., for instance, has no MAP plans for the near future. The packaged-cereal manufacturer's London, Ont., plant is predominantly a two-vendor shop now: VAXs and DEC Microvaxs control materials handling and processing and are linked up to Allen-Bradley CNCs and PLCs via Allen-Bradley's Data Highway network.

While Kellogg might have considered MAP if the standard had been available at the time of installation — several years ago — conversion makes little sense now, especially since Kellogg decided in 1981 on a policy to limit the number of vendors it uses, explained Vice-President of Information Technology Peter Cox. "Perhaps the challenges facing discrete manufacturers require them to use products from many vendors," Cox suggested. "Control requirements for our type of manufacturing allow us to limit the number of automation options used."

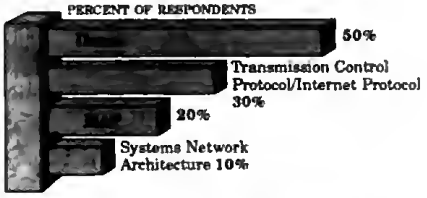
"For some of our clients with small-scale factory automation projects where a single-vendor solution will do, we don't recommend MAP," commented Douglas Richardson, a project manager at computer-integrated manufacturing service firm ITP Boston, Inc. "Small companies just want a given site to be linked with the least cost and least risk — they just want the damn thing to work."

Even at large companies like Weyerhaeuser and Pratt & Whitney, "Each factory automation island may not justify MAP on its own," which may tempt a firm to avoid the MAP issue all together, Richardson noted. "But when the time comes to integrate those islands, you'll wish you'd done MAP."

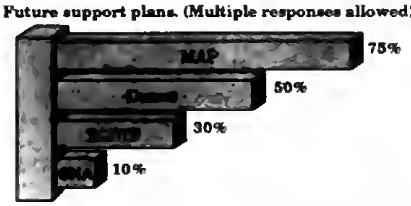
Factories follow the MAP

While Decnet should hold its ground, 75% of manufacturers surveyed plan Manufacturing Automation Protocol installations

Communications architectures supported to date. (Multiple responses allowed)



Future support plans. (Multiple responses allowed)



INFORMATION PROVIDED BY ADVANCED MANUFACTURING RESEARCH
CW CHART SUSAN ALDAM

IBM to fix 9335 — on request

BY STANLEY GIBSON
CW STAFF

IBM said last week it has corrected a problem with its A01 direct-access storage device (DASD) controllers that had prevented the 9335 DASD from running at its specified speed.

The 9335 units, which were announced in June 1986, serve System/38 and 9370 machines. Units manufactured after July 1 of this year will contain the change, but IBM will not retrofit the some 10,000 currently installed units unless requested to do so by customers, an IBM spokesman said.

Some users and analysts had reported that the 9335s were not performing up to specifications and were slower than the older 3370 models [CW, Nov. 3, 1986]. According to published specifications, the 9335 units were designed to perform faster and cost less than 3370 drives. Last week, an IBM spokesman conceded the drives were not performing up to par.

"In most customer environments, the 9335 provided system-level performance equal to the 3370, but in some heavy transmission environments, it would not perform as well," the spokesman said. The change improves performance of the drives, although the spokesman declined to say by how much.

In addition, the engineering change permits the A01 controller to operate interchangeably with System/38 and 9370 processors.

Migration not expected

The IBM spokesman said the engineering change does not imply that System/38 users will be urged to migrate to 9370s. "We don't expect a lot of customers to want it. Typically, your System/38 customer will not migrate to the 9370," the spokesman said.

The change to the A01 controller is in the hard-wire microcode in the read-only memory module and requires Version 8.2 of the System/38's CPF operating system, according to the spokesman.

David Andrews, president of ADM, Inc. in Cheshire, Conn., said his company found that IBM sales and technical support personnel had been telling customers that, in spite of superior specifications, the 9335 systems might not perform as fast as 3370 drives. "IBM was telling users [that] performance wasn't good with the new drives," Andrews said.

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Mac II Ethernet adapter card to cement Apple links to DEC

BY PATRICIA KEEFE
Staff Writer

SANTA CLARA, Calif. — Apple Computer, Inc. will inch closer to seamless integration with Digital Equipment Corp. computers when it ships a Macintosh II-compatible Ethernet adapter to customers in the fourth quarter.

3Com Corp., based here, gave a boost last week to Apple's DEC connectivity plans when it said it will ship the jointly developed Mac II Ethernet adapter to Apple this quarter.

The card reportedly will be marketed by Apple as Ethertalk. Apple is completing development on companion software that will provide hooks into Transmission Control Protocol/Internet Protocol (TCP/IP) under A/UX — Apple's yet-to-be-released Unix for the Mac — and also support for the company's Appletalk under the Mac operating system, said Peter Hirshberg, Apple's desktop communications marketing manager. Both packages should be ready in the fourth quarter.

A/UX is also slated for fourth-quarter delivery. Announced in March, it was co-developed with Berkeley, Calif.-based Unisoft Corp. Plans to announce pricing and license programs for A/UX this month have been pushed back to late summer. "We have a number of unresolved issues around the licensing and support," said Christopher Espinosa, Apple's product manager of systems software.

3Com said it plans to market the same Ethernet card for both the Mac II and the Mac SE under an as-yet-undetermined name and at a slightly lower price than the Apple version.

Hirshberg said Ethertalk helps Apple users in two ways: first, by providing a faster medium for the Appletalk network; and second, by allowing Mac users access to DEC solutions.

Appletalk's transmission speed of 230.4K bit/sec. can create bottlenecks at the server, as opposed to Ethernet's speed of 10M bit/sec., which provides more than 40 times the network bandwidth. "Under Appletalk, if you need speed of any reasonable level, you'd need to put hard disks on every machine because you can't put a lot out on the server; it would be too slow," said Derek Brown, 3Com's product manager of Macintosh products.

Users will have the option of just putting Apple's Appleshare file server on Ethernet, which will also increase network performance without putting the workstations on Ethernet.

More important, Apple watchers said, Ethertalk gives Apple access to the DEC environment. "By providing a direct connection to Ethernet for the Macintosh II computer, Apple will expand the market for Macintosh into those businesses where Ethernet is the network of choice," said Doug Pollack, 3Com's director of corporate marketing. DEC's networking scheme is based on Ethernet.

The 1988 Dexpo East trade show next February will feature a separate Apple/DEC Connectivity Center and devote a program track to connectivity between the two environments, Espinosa said.

Further abetting Mac access to DEC systems will be A/UX. A/UX does not run on the VAX. But when running on the Mac II over Appletalk and using Ethertalk, it will provide Macs with access to DEC file servers and facilitate file transfer with systems running under DEC's Ultrix version of Unix. Transparent file exchange between the two environments will be accomplished via the TCP/IP and Sun Microsystems, Inc. NFS protocols, Espinosa said.

'And now . . .'

CONTINUED FROM PAGE 1

Once the primary province of microcomputers that were targeted as much at consumer or educational markets as they were to the MIS community, television has recently been the venue for major business-targeted campaigns from Wang, Unisys Corp., HP and IBM.

But rather than pitching specific products, HP, Unisys and Wang are trying to portray their companies as sophisticated, solutions-oriented partners for their customers' business computing needs.

In 30 seconds — sandwiched between ads for beer, shaving cream and lawn mowers — image is everything. In those 30 seconds, Wang is trying to shed its mantle as a word processing vendor, HP is attempting to transcend the scientific and technical marketplace and Unisys is telling corporate America that its whole is greater than the sum of Burroughs Corp. and Sperry Corp.

Promoting an image

"The Wang ads make them sound more important in the business market than the market-share numbers indicate, but advertising is allowed to do that," said Amy Wohl, president of office automation consulting firm Wohl Associates in Bala Cynwyd, Pa. "They need a device to remind you that they're in this business. TV is not a cheap way of doing it, but in their case, it may be necessary."

Wang's unprecedented decision to use the MIS professional's jargon in its current campaign has provoked strong audience opinions on both sides, but the company staunchly defends the use of phrases that sound to most TV viewers like "mumbo-jumbo," according to Wohl.

"Whether you love the commercials or hate them, everybody is talking about them," said Ian Diery, Wang's new senior vice-president of U.S. operations. "I believe that investment in computers, networking and software is so much a part of the balance sheet of today's companies that senior management and chief executive officers understand the words integration and SNA networks. And I think we should pay due respect to that."

Furthermore, Wang believes it has begun a new trend in computer advertising — one that will forsake IBM's "little tramp," and Apple Computer, Inc.'s surreal imagery — for messages that speak computerese.

"I think there will be a gestation period while other companies don't want to look like they're copying Wang, but then you will see a lot more of it," said Don Easdon, co-creative director of Wang's advertising agency, Boston-based Hill, Holliday, Connors, Cosmopulos. "The Max Headroom show on TV, for example, uses the jargon of the future because it's already part of our language. We've simply recognized that fact."

IBM, a fixture of TV computer advertising, takes a very different approach. It certainly doesn't need to enhance its image as a major player in business computing but instead has sunk its advertising millions into a big-splash product-line introduction with a broad-based appeal. "We want to reach 160 million people by July," said Linda Dezan, a spokeswoman for IBM's Entry Systems Division. "TV is the only way to do that."

Despite the Personal System/2's sales pitch as a sophisticated business solution with improved links to the mainframe, IBM's advertising philosophy for the product builds on many of the same themes of the Charlie Chaplin Personal Computer campaign — familiarity and recognizability. Instead of one popular character, IBM now uses a team of actors from the old "M*A*S*H" TV series to emphasize the PS/2's multiuser and networking appeal.

"We haven't changed our approach to the market," Dezan said. "The new product line needed its own identity, so we wanted immediate recognition. But we're still trying to reach end users as well as influencers and decision makers. Using mass media for a product family of this magnitude and scope is very effective."

Even though its current ads pitch a specific product line, IBM is still essentially promoting an image rather than the intricacies of Micro Channel architecture or OS/2. "These are evangelism days for the PS/2," said Tim Bajarin, vice-president of Creative Strategies Research, Inc., a consulting and research firm in San Jose, Calif. "IBM is spending marketing dollars now to educate the market for a whole product direction."

Megabucks of advertising

Dollars for television advertising are not cheap. A 30-second spot in a regular-season National Football League telecast, for example, runs about $100,000. Although vendors will not disclose the cost of their ad campaigns, a Wang spokesman said the Lowell, Mass., firm will spend more for three months of TV advertising than it did on *all* advertising in the last six months of 1986.

But computer firms insist that television advertising, in demographically appropriate spots such as newscasts and sports events, is a cost-effective way to reach a corporate audience that extends well beyond the walls of the data center.

"TV is not the main component of our new name-recognition campaign, but it certainly has its place," said Jeanette Lerman, Unisys's vice-president of corporate communications. "In six weeks, people knew our name. I don't think we could have done that without television."

In a sense, vendors believe that simply appearing on network television can enhance a potential vendor's stature in the minds of top executives. "TV can create the sense of credibility, of bigness, if you will," said Raj Gupta, vice-president of Chicago-based ad agency Leo Burnett U.S.A. and account supervisor for HP's "What if . . ." campaign. "It contributes to a company's viability and a sense of its staying power."

"The industry is very crowded," said Wohl. "It's easy for a customer to pick the largest company, the one easy choice. But the competitors need to have name recognition, to get senior executives to ask 'Shouldn't we also consider. . .?' And that's an advertising game."

Even Digital Equipment Corp., which has staunchly resisted the television medium, will be relenting this fall — albeit in very characteristic DEC fashion.

The Maynard, Mass.-based firm will be the exclusive sponsor of a science program called "The Infinite Voyage." Although created for public television, the series will air on selected commercial stations — with DEC advertisements — for the first time. "But we still don't believe in a shotgun approach to the general public," said Bob Kucharvy, DEC's manager of corporate publicity programs.

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Package converts VTAM hosts to file servers

Enhanced virtual disk support and file transfer also included in Micro Tempus intros

BY ELISABETH HORWITT

MONTREAL — Responding to customer demand for local-area network (LAN)-based micro-to-mainframe connections, Micro Tempus, Inc. last week unveiled Tempus-Share, a software package that converts IBM VTAM hosts into IBM Personal Computer network file servers.

Also announced were an enhanced version of the existing Tempus-Link micro-to-mainframe product and a VTAM version of Host Application Programming Interface, a PC- and mainframe-resident program that coordinates micro-to-mainframe virtual-disk access and file transfer.

"Tempus-Share is the next generation of micro-to-mainframe links and the first to support DOS 3.1 and [IBM] Netbios-based local-area networks," said Micro Tempus President Yvon Leveille.

Tempus-Share 1.0, which is scheduled to be available in July, provides several features that are missing from Micro Tempus's existing virtual-disk micro-to-mainframe software product, Tempus-Link. While Tempus-Link only allows one user at a time to write to a virtual disk on the mainframe, Tempus-Share allows PCs running IBM's PC-DOS Version 3.1 or higher to concurrently read and update virtual-disk files on an IBM 370 through the VTAM environment.

The software provides concurrent file update with record locking by interfacing with applications written for the Netbios PC LAN protocol and PC-DOS Version 3.1. While the software will interface with PCs on a Netbios-compatible LAN, it also interfaces with PCs that are linked to the mainframe via other types of connections, such as a 3270-PC or asynchronous link, Leveille said.

Other Tempus-Share features include the following:

- Direct file transfer between an IBM PC disk and a mainframe file without the Tempus-Link requirement of using the virtual disk as an intermediate staging area.
- Unlimited virtual-disk sizes.
- Concurrent, contention-based file accesses between any number of on-line PC users and mainframe batch programs.

Nice place to visit

"The new VTAM support sounds attractive," said William Burrows, a data processing officer at Connecticut Mutual Life Insurance Co., which currently uses Tempus-Link. "I have assumed, for some time, I have a certain amount of overhead having to run it under CICS — always a difficult tuning environment."

Burrows seemed less sure about whether his company would actually purchase Tempus-Share. "We're not using Tempus-Link for data base activity that requires record locking," he said. "We have started to implement LAN-type things very successfully, but as a general rule, we are moving away from using our host as a shared resource for PC population."

Steven Berto, project manager for Metropolitan Life Insurance Co., agreed that the VTAM connection would significantly enhance performance but said he wondered about how much work it would take to migrate his company's existing CICS-based Tempus-Link applications to VTAM and Tempus-Share. "I'm confused about whether or not it's something you can add on top of your existing application," he added.

While migrating IBM TSO-based applications to VTAM is almost a transparent operation, migrating CICS applications to VTAM will take some work, since it involves removing the Common Level Interface that is part of CICS but not of VTAM, explained Micro Tempus Vice-President of Development Richard Pelletier. "However, there is no need for this migration, since Tempus-Link can share libraries with Tempus-Share," he said.

Migration drawbacks

But while Tempus-Link users can share virtual-disk access with Tempus-Share users, once a Tempus-Link user begins writing to a disk, all other users are locked out from updating that disk because the older program has no record-locking feature, Pelletier noted.

Mainframe application migration from Tempus-Link to Tempus-Share involves rewriting the interface, Pelletier said. But the applications would have to be rewritten before they could handle concurrent file access.

Micro Tempus also introduced Tempus-Link Version 3.2, which offers several enhancements, including a Share option that permits both PC users and batch programs to access a virtual disk concurrently, with one writing and the other reading to disk. The older Tempus-Link version allowed only a virtual disk to be accessed by only one program at a time.

Tempus-Link Version 3.2 also features an increase of virtual-disk size to 30M bytes and a cache facility. Pricing ranges from $9,800 for up to 10 users to $60,000 for more than 200 users. This product also is scheduled for availability in July.

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NEC super

CONTINUED FROM PAGE 1

to $20 million for the SX 2-400. The SX 2-100 and SX 2-200 are new machines that Honeywell-NEC Chairman and Chief Executive Officer James R. Berrett said are faster than their predecessors, the NEC SX 1 and the SX 1-E.

Berrett said independent benchmarks have shown the SX 2-400 to have a peak performance rate of 1.3 billion floating-point operations per second (GFLOPS). He said sustained performance rates are about 400 GFLOPS for the SX 2-400, 200 GFLOPS for the SX 2-200 and 100 GFLOPS for the SX 2-100.

The SX 2 series is positioned to compete primarily with supercomputers offered by Cray Research, Inc. and ETA Systems, Inc. in the U.S. and Canada and systems by NEC rivals Fujitsu Ltd. and Hitachi Ltd. in Japan.

Berrett claimed Honeywell-NEC will be ready to announce SX 2 contracts by the end of this year. The HARC sale was made by NEC prior to the joint-venture agreement.

Honeywell-NEC Executive Vice-President Charles J. Nies said a key feature in the SX 2 series is the integration of a control processor, which takes the place of a front-end processor in other supercomputers. That control processor runs Fortran 77 and NEC's ACOS 4 operating system. It also manages the memory and the arithmetic processor.

Nies said that while NEC builds the entire supercomputer in Japan, Honeywell-NEC has been ordering changes for the U.S. market, including support for third-party peripherals and software. One such feature that has been added, Nies said, is Network System Corp.'s Hyperchannel. Nies said interfaces currently under development include ties to IBM's MVS and Digital Equipment Corp.'s VMS and Ultrix.

Berrett noted that Honeywell-NEC is unlikely to be affected by protectionist trade regulations being promoted in Congress, partly because he has maintained contact with interested parties to exempt supercomputers from such legislation.

Berrett added that while there have been U.S. complaints about U.S. supercomputer makers holding only a 20% market share in Japan, Japanese makers have a less than 1% share of the U.S. supercomputer market. He claimed that the Japanese government is attempting to make it easier for U.S. supercomputer makers with planned moves, such as allowing U.S. vendors to use English throughout the bidding and contract process.

He said Honeywell-NEC, which is based in Burlington, Mass., has about 30 employees, most of whom are sales personnel. He said the company is counting heavily on Honeywell's Federal Systems Division as a contact with U.S. agencies that have been prime supercomputer users in the past. Honeywell-NEC benefits from that relationship because of the federal division's experience in government markets and because the relationship overcomes any security barriers posed by Honeywell-NEC's being 50% owned by a foreign entity.

Pilot package lets executives drill for detail

BY CHARLES BABCOCK
CW STAFF

BOSTON — An executive reporting and data manipulation package that can "drill down" to sought-after detail and search for trends and exceptions is set to be announced today by Pilot Executive Software.

The package, called Advantage, allows a nontechnical executive to draft a report and then, with each review, order the system to inspect the underlying data in the data base until the level of detail desired is reached. "You can drill down through several levels of detail. You never know which 1% you want each month," said David Friend, chairman of Pilot.

The system can scan the Advantage data base, looking for exceptions to parameters set for sales or other business data preset by the user. An exception report can then be delivered to the manager, distilling hundreds of report screens to the high-priority problems, Friend said.

The system is also capable of comparing current information with historical data, which can be presented in text, tabular or graphic summaries, he said.

Advantage works in conjunction with Pilot's executive information package, Command Center, which was first announced in early 1985, and with a PC segment of Advantage that ties to the mainframe or Digital Equipment Corp. VAX host.

The system was designed to summarize sought-after decision making information rather than model business problems, as in a decision support system, or perform analysis on a group of statistics, as in statistical analysis packages. Reports are drafted on the PC via the Command Center language and predesigned reporting formats.

Advantage runs under VM/SP 4.0 or higher versions on the mainframe and is available immediately. The total system is priced at $95,000 on the DEC Microvax, $110,000 on the VAX and $155,000 on an IBM mainframe.

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Wang sends PCs to beta sites

Aims to avoid charges of 'vaporware' via early-shipment program

BY ALAN ALPER
CW STAFF

LOWELL, Mass. — Wang Laboratories, Inc., as part of a corporate strategy aimed at better meeting delivery dates, has begun shipping limited quantities of two unannounced microcomputers to select customers.

The firm has been shipping Intel Corp. 80286- and 80386-based microcomputers to a variety of customers, including American Express Co. and the U.S. Army, Wang customers said.

The new personal computers — dubbed the Wang PC 280 and 380 — are slated to be introduced sometime within the next several weeks, sources said.

Also expected to be announced before the end of Wang's fiscal year, which concludes on June 30, is a network server said to enable Wang VS minicomputers to communicate with 80286- and 80386-based PCs on a token-ring network.

Win Burke, Wang's director of desktop systems product management, said the intent of the early shipment program is to help the firm meet a year-old corporate objective of delivering new products within 90 days of public introduction.

"A number of vendors, including Wang, have been criticized in the past for announcing vaporware," Burke said. "It's been an issue with the financial community and our large users."

Wang is being particularly cautious with its desktop workstations, making sure the products pass quality assurance tests before they go out the door, Burke said.

"We're being more conservative with our desktop products," he said. "We want to be sure we can ramp up production before their public announcement so we can meet our shipment schedules."

Burke declined to confirm the specifications of the firm's new PCs or provide projected pricing and general availability. He reiterated that any new products would fit Wang's workstation strategy of providing desktop systems that are appropriately tuned for its VS environment and run applications under industry-standard operating systems such as Microsoft Corp.'s MS-DOS.

Sources, however, said the Wang PC 380 is a 386-based micro running at 8 or 16 MHz and offers an optional 10-MHz 80287-based arithmetic coprocessor.

The system features 2.5M bytes of random-access memory (RAM), a 1.2M-byte floppy disk, a 68M-byte hard disk, a standard Wang keyboard and a video controller board that is switch selectable for IBM's Color Graphics Adapter and Enhanced Graphics Adapter and monochrome capabilities. The 380 is expected to have a list price of $8,500.

The Wang PC 280, a 286-based machine that runs MS-DOS 3.2 and operates at 6, 8 or 10 MHz, is being offered in three versions.

The PC 280 Model 1 comes with eight slots, 640K bytes of RAM and a 1.2M-byte floppy disk. Model 2 adds a 360M-byte floppy disk, while Model 3 is equipped with a 34M-byte hard drive. The 280 models also come equipped with the same video controller board as the 380.

Prices of the 280 family range from $1,500 to $4,875, sources familiar with the products said.

One user, who requested anonymity, said he is running IBM's Operating System/2 and Microsoft Windows on the new PCs. Burke would not comment on when or if Wang would support OS/2 but suggested the firm is leaning toward an embrace of the IBM's new high-end operating system.

> "A NUMBER of vendors, including Wang, have been criticized in the past for announcing vaporware."
>
> WIN BURKE
> WANG LABORATORIES, INC

"OS/2 is an operating system for [IBM Personal Computer] AT compatibles just as much as it is for IBM's Personal System/2," Burke explained. "It will be marketed and delivered by PC vendors — not just IBM. It would not be wrong to assume that we would be included in that group," he added.

Burke similarly declined to confirm the existence of a network server supporting token-ring. "Last year, we made the statement that we would support both Ethernet and token-ring," he said. "We're still committed to a strategy of implementing products which utilize both standards."

Burke refuted rumors that Wang is considering discontinuing its existing AT compatible, the Advanced Personal Computer. The product has done well, he said, citing an installed base of about 400,000 units.

"A lot of Wang VS customers like a high-end workstation. Value-added resellers, in particular, are actively writing applications which take advantage of the proprietary features of the existing product line," Burke noted. "There's momentum in the product line that will go on indefinitely."

He said Wang has installed approximately $600 million worth of desktop systems during the last few years. "You look at Compaq Computer Corp.'s revenues and compare them to ours, and you see we're not in too bad a position," Burke noted. "It's been a somewhat quiet success."

Wyse bolsters line with modular micros

BY ED SCANNELL
CW STAFF

SAN JOSE, Calif. — Wyse Technology rolled out a series of Intel Corp. 80386- and 80286-based systems last week that use a modular architecture as well as a line of color monitors compatible with IBM's Video Graphics Array standard.

The four systems include the Model 3216, which uses a 16-MHz 80386 processor, and three additions to the company's WysePC 80286 family. The new members include the 8-MHz Model 2108 the 12.5-MHz Model 2112 and the 12.5-MHz, zero-wait state Model 2214.

All four systems' modular architectures feature backplane design with the CPU mounted on a self-contained plug-in circuit board. This enables users to upgrade the machines' performance and processors by replacing existing boards with new ones, a spokesman said.

The 80386-based Model 3216 was designed to run sophisticated applications for computer-aided design, network file serving and multiuser and multitasking processing. The system is fully compatible with IBM's Personal Computer and PC AT and runs multiple operating systems, such as AT&T's Unix System V, Release 3 and Microsoft Corp.'s Xenix and MS-DOS.

The Model 2108 is intended for general business applications and features 512K bytes of random-access memory and seven accessory slots, all of which are compatible with the AT.

Maximizing performance

Users of the Model 2112 have a switch-selectable 12.5- and 8-MHz processor that maximizes performance of disk-intensive applications such as large spreadsheets, data bases and desktop publishing programs. The Model 2214 also has a switch-selectable 12.5- and 8-MHz processor but offers nine AT-compatible expansion slots.

Last week, Wyse also announced its Intelligent Multiuser Interface Board, which is said to permit eight terminals, modems and printers to be connected to AT-compatible systems. The company said it is the first such board to attach devices using standard RJ-11 connectors that cut the expense of separate cabling and connector systems.

A third announcement from Wyse was a 3½-in., 1.44M-byte floppy diskette drive option for the new systems, which is slated to be available in September.

The WysePC 386 with a single floppy drive is priced at $3,799; the 40M-byte hard-disk version costs $4,999. The Model 2108 with a single floppy drive costs $1,599. The Model 2112 with a 40M-byte drive is priced at $3,499, and the 2214 with a 40M-byte drive is $3,999. The multiuser interface board has a list price of $695.

Tandon Computer Corp. also unveiled enhancements for its line of PC- and AT-compatible systems last week and reduced the price on most of its models by up to 25%. Three systems in Tandon's PCX family have been upgraded with a serial card and dual video adapters.

Tandon lowered the prices of its PCX-2, a dual-floppy XT compatible, to $899; and its PCX-20, a 20M-byte XT compatible, to $1,399. Tandon reduced the prices of its PCA-20, a 20M-byte AT compatible, to $1,999; and its PCA-70, a 70M-byte AT compatible, to $3,699.

Capacity snags

BY ROSEMARY HAMILTON
CW STAFF

PALO ALTO, Calif. — Fairchild Semiconductor Corp. remains unable to meet customer demand for its 32-bit microprocessor chip because of a lack of manufacturing capacity, a company official said last week. As a result, Fairchild is not yet producing its Clipper chip in full volume, although the company had originally stated it would do so by the fourth quarter of last year.

"I'd like to convince you that customers are beating down our door for the Clipper, but to be honest with you, we have the six that we've identified and a few handfuls more," said Scott Harmon, director of marketing. "It's a capacity problem."

The production problems should be smoothed out within three months, Harmon added, because the chip maker has recently begun contracting out Clipper manufacturing to other semiconductor houses to catch up with customer demand. According to Harmon, the outside work is now underway. However, he would not identify where the work is being done.

Domino effect

In the meantime, the Clipper delays are having a domino effect. At least one major customer, Intergraph Corp. in Huntsville, Ala., the computer-aided design and manufacturing industry's second largest systems vendor, has had to postpone the introduction of new graphics workstations.

Intergraph now plans to introduce its 32C workstations — originally scheduled

DG redoubles efforts in compatible laptop fray

Undaunted by lackluster DG/One sales, firm claims 80% speed boost in revamp

BY DAVID BRIGHT
CW STAFF

WESTBORO, Mass. — Data General Corp. last week announced an upgraded IBM Personal Computer-compatible laptop machine said to run 80% faster than the previous model.

According to Skip Duggan, director of the volume products division, the battery-operated Data General/One Model 2T system, priced at $1,695, "reconfirms" DG's commitment to state-of-the-art laptop computing and is a price/performance leader as well.

"We still have the only portable [IBM PC] XT [compatible]," Duggan said. "Everyone else still sells transportables." For example, he stressed that neither Compaq Computer Corp.'s Portable III system nor Toshiba America, Inc.'s T3100 unit can run on batteries and that Zenith Data Systems' Z-181 has a shorter battery life than the Model 2T and does not come with a hard disk drive.

Speed increase

The Data General/One Model 2T's Intel Corp. 80C88 microprocessor runs at either 4.77 MHz or 7.14 MHz, compared with 4 MHz on the previous version. The entry-level model with one 3½-in. floppy disk drive now includes a backlit, supertwist LCD screen; the same configuration with an electroluminescent screen lists for $2,695. While memory on the Model 2 ranged from 256K bytes to 640K bytes, the Data General/One Model 2T's capacity spans from 512K bytes to 2.5M bytes of memory conforming to the Lotus/Intel/Microsoft Expanded Memory Specification.

Also new, in the LCD version only, are removable nickel cadmium batteries that provide up to five hours of operation. The electroluminescent model requires an external battery pack.

An LCD version with one floppy disk drive and a 10M-byte hard disk drive lists for $2,895, the same configuration with an electroluminescent screen is $3,895.

The Data General/One, introduced in September 1984, was one of the first full-screen IBM PC-compatible laptop systems.

However, initially plagued by engineering difficulties such as barely readable LCD screens, the machine did not sell well. In May 1986, DG announced an improved Model 2 system with an optional internal 10M-byte hard disk drive and electroluminescent display.

Through the end of 1986, DG had shipped just 12,585 Data General/One systems and 9,300 Model 2s, according to International Data Corp. (IDC), a Framingham, Mass.-based market research firm. In comparison, Toshiba shipped some 29,000 laptop systems in 1986 alone and IBM shipped 23,000 PC Convertible systems after the machine's April 1986 introduction, IDC reported.

"The Data General/One was on the market before its time and was not enhanced sufficiently to match the later machines that came on the market just as the market was picking up," said Michael Goulde, an analyst with The Yankee Group market research firm in Boston. Therefore, Goulde said, DG has found itself constantly "playing catch-up" with its laptop offerings.

stall Fairchild

to debut last week — in mid-June and said a major reason for the postponement was Fairchild's inability to fill its orders.

According to Harmon, the Clipper competes with two other product families within Fairchild for manufacturing time, and "all three are hurting." Harmon said the company's up-in-the-air status has not had an impact on Clipper production.

For some months, Fairchild, owned by Mountain View, Calif.-based Schlumberger Ltd., has been for sale.

In fact, Fairchild was referred to as a "discontinued operation" in the Schlumberger 1986 annual report. A Fairchild spokeswoman said the annual report was prepared in late 1986 when it appeared that the company would be purchased by Fujitsu Ltd. in San Jose, Calif.

Those negotiations fell through earlier this year.

The decision to contract out Clipper work was not made because of Fairchild's ownership issue, according to Barry Barrett, a Clipper product manager. "That is a time issue," he said. "It would take us two to three years to get out of the woods if we built a new factory."

Adding to the problem of limited capacity within Fairchild was the Clipper division's conservative estimates of customer demand, Barrett said. Several customers revised their 1986 orders early this year "by as much as tenfold." As a result, he said, "that left us with the short end of the stick."

Yet, at least one major customer contradicts that claim. "If customers upped their orders by as much as 10 times, we were not part of that group," an Intergraph spokesman said.

Pentagon investigates inventory systems

Defense Department suspects MRP software may let contractors overbill government

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Pentagon last week launched a sweeping investigation of the inventory and accounting computer systems used by 300 major defense contractors because it suspects the systems are unreliable and overcharging the government by millions of dollars.

Auditors from the U.S. Department of Defense are gravely concerned that deficiencies in the software may allow contractors to improperly shift costs from one contract to another, inflate prices and double-bill for spare parts, officials said.

The probe focuses on material requirements planning (MRP) software, also known as manufacturing resource planning software, which contractors use to control inventory and to bill the government for parts and tools.

Suspects lack of internal controls

In essence, the government suspects that the MRP systems lack the internal controls necessary to meet the rigorous cost-allocation requirements of military contracts. If the MRP systems are at fault, the Pentagon may order defense contractors to stop using them until the systems meet government standards for reliability, according to Robert B. Costello, assistant secretary of defense for production and logistics.

Costello declined to name any of the MRP software packages that are under scrutiny.

"It sounds like they have a beef with the internal logic used to do cost accounting for contracts," said Alice Greene, a senior analyst who studies manufacturing software for International Data Corp. in Framingham, Mass.

Greene said the Pentagon's concern is valid for traditional generic MRP software but that in recent years, MRP vendors have offered dedicated government packages that have the cost-allocation features required for government contracts.

Vendors offering dedicated government MRP packages include Arthur Andersen & Co., McCormack & Dodge Corp., Management Science America, Inc. and Cullinet Software, Inc., Greene said.

The official Defense Department policy is to "assure that MRP systems are corrected and that any overpayments or premature progress payments are recovered," Pentagon spokesman Robert B. Sims announced last week.

Audits triggered probe

The investigation was triggered by a series of audits by the Defense Contract Audit Agency (DCAA), which identified 10 common deficiencies in MRP systems that may make them unsuitable for military contracts and may put them in violation of various accounting standards and procurement rules.

In particular, the DCAA found that "inappropriate integration of cost accounting and MRP systems" can result in inaccurate costs charged to contracts and billed to the government, improper progress payment requests, inaccurately projected future costs, inaccurate cost reporting and defective pricing.

Costello said he would expect MRP systems to assign each part in inventory to a single contract so that auditors could trace the item throughout the procurement process, but they apparently fail to do that.

"The intent of MRP was [to] be able to take that part and put it on that contract. It's a nice, clean way to do your business. I'm not sure why people may have changed that for this kind of work," Costello said.

Wants explonotion in 30 doys

To start its broad investigation, the DCAA last week mailed letters to the 300 contractors, demanding an explanation within 30 days.

In the terse letter, officials required a "timely assessment and advice on what procedures or controls exist to assure that the common costing and regulatory deficiencies identified . . . are not present in your system."

The industrywide probe by the DCAA is expected to last a year, but Costello is conducting an inquiry that may be wrapped up in June or July.

Costello said he will meet with several MRP software vendors this month to find out whether the problem is with the software algorithms or with the actions of contractor employees.

Costello stressed that he wants to learn more about the software vendors' algorithms.

"I want to know what their algorithm is . . . the tree that you go down through to say what I do with this number, where does it go, what records do I keep, how can I adjust that number, what changes can be made," he said.

Costello, who was purchasing director for General Motors Corp. until he took the Pentagon job two months ago, vowed to recoup all of the contractor overcharges.

Integration focus of image management show

BY JAMES CONNOLLY
CW STAFF

NEW YORK — Integrating image management into MIS systems, particularly through networked optical disk storage, was a key theme at the Association for Information and Image Management conference and exhibition earlier this month.

The show attracted about 15,000 attendees, many of whom appeared to be considering their first optical storage acquisitions. However, some managers from large corporations and government agencies noted that the technology on display, while close to being what they need, still lacked features such as the ability to edit stored documents like contracts.

Several vendors highlighted their ability to tie optical-based image systems into existing data processing systems. Most of those links, several of which were announced months ago but displayed for the first time here, provide the ability to maintain directories of optically stored documents on magnetic disks in minicomputer or IBM mainframe environments.

Wang Laboratories, Inc., Plexus Computers, Inc., 3M Co. and Eastman Kodak Co. demonstrated systems with minicomputer and mainframe links.

Kodak also announced a computer-assisted microfilm-retrieval system designed for eight or more users and based on the Digital Equipment Corp. Microvax II minicomputer. The KAR-7500 reportedly can be networked with the Kodak KIMS 4500 and KIMS 5000 microfilm and optical disk-based information systems that were introduced in March. The KAR-7500 reportedly handles volumes of 1,000 to 30,000 documents per day and costs $95,000 to $175,000.

Cygnet Systems, Inc. and Laser Magnetic Storage International (LMS) announced an agreement under which Cygnet will sell LMS's Laserdrive 1250 optical disk drives as part of Cygnet's Series 1800 Expandable Jukebox. The Laserdrive 1250 is a write-once read-many (WORM) optical disk drive that uses 12-in. disks with a capacity of 1G byte per side. Cygnet said the Series 1800 can be used with up to five drives and 95 disks.

LMS also made a joint announcement with Summit Software Corp. of a 12-in. WORM drive priced at less than $60,000. The system uses Summit's Laser-Base operating software and retrieval engine. One 12-in. drive is used in the Summit 1200 and two drives are used in the Summit 2400 filing systems.

A Rockville, Md.-based startup company, Filetek, Inc., introduced its Storage Machine/1, which company officials said integrates optical disk and magnetic storage in a system controlled by Filetek software. Filetek President William C. Thompson said the Storage Machine/1 is aimed at IBM mainframe and DEC minicomputer sites requiring large on-line storage capacities. He said configurations will range from 114.4G bytes to 4.2 terabytes, with host connections being handled by Network Systems Corp.'s 50M bit/sec. Hyperchannel.

Thompson said the Storage Machine/1 provides better throughput than competing storage systems because it supports up to eight optical library devices, the Hyperchannel bandwidth and better data integrity. A 160G-byte system costs $479,000 plus the cost of the network interface and host software, which ranges from $1,000 to $25,000.

Prime forges vendor links

BY DONNA RAIMONDI
CW STAFF

NATICK, Mass. — In a move to coexist with multiple vendors' equipment, Prime Computer, Inc. recently released several communications products.

The products include the following:

- LAN300 network terminal service software, which is said to allow users connected to Prime terminal servers on Ethernet networks to log on to any 50 series system on the local-area network (LAN) and costs from $150 to $300.
- The $3,300 LTS300 LAN terminal server, connecting up to eight asynchronous terminal devices, allows 50 series terminals to talk to any CPU in a LAN.
- The WSI300, Prime's implementation of the Transmission Control Protocol/Internet Protocol for connecting Unix systems to Ethernet LANs at a cost of $1,000 to $7,500.
- Primenet software additions will support the CCITT X.25 1984 standards for data sharing and file transfer among different vendors' hardware. The software additions will also support ISO protocol 8208. Primenet with X.25 facilities costs $7,500. A packet-switched data network spooler allows users to print files on remote printers directly attached to the switched data network and costs from $1,500 to $3,000.
- Prime/SNA Application Program Interface allows program-to-program communications between a Prime software application and an application running on an IBM Systems Network Architecture host and costs from $1,000 to $9,000.

EDITORIAL

Vaporous flurry

Lotus Development Corp. launched a vaporware attack last month on rival Microsoft Corp. We can expect it will only be a matter of time before Microsoft responds in kind. IBM, in the meantime, has laid out a vapor trail that should keep the industry buzzing late into next year. And it's only the beginning of May.

The subject of all this product antimatter is OS/2, the operating system for advanced-generation personal computers that was announced by both Microsoft and IBM early last month after a year of rumors. OS/2, which won't ship for at least nine months, is giving the PC industry what it has desperately needed of late — something to speculate about.

OS/2 is likely to touch off a scramble in the software businesses as developers — particularly publicly held ones — scrap to proclaim that they, too, will live under the new operating system umbrella. What will be notable about much of this positioning is the stunning lack of information on vital statistics, such as price, availability and skeletal outlines of product features.

The reasons for this, in some cases, have little to do with customer needs. Software vendors are furiously jockeying for position in this year-long gray period between OS/2's announcement and its delivery. Microsoft and IBM have set the tone by unveiling products that are in such a seminal state of development that, in the case of IBM's OS/2 Extended Edition, even approximate shipping dates are unspecified. PC software companies, whose stock prices can fluctuate wildly over fuzzy perceptions of whether or not they are on the "leading edge" of changing technologies, are under intense pressure to prove that they are ready for the next-generation operating system — even if most observers admit that it will win over the market slowly.

To the vendors' credit, there is much to be said for giving computer users a sense of where the industry is going. For a company like Lotus, whose vast customer base affords it the luxury of legitimizing new technologies, a "yea" or "nay" on OS/2 is a significant statement of support.

Nevertheless, buyers would be well advised to keep this round of product positioning in perspective. With so few details to offer, Lotus, Microsoft and IBM are now doing little more than offering direction statements wrapped in fancy product names. The announcements are also intended to establish each vendor's position in the stock market. As evidence of that, Microsoft shares have soared 25 points in the last five weeks, and Lotus stock climbed 30% in the week following its announcement.

For MIS executives, however, the real world is still DOS 3.0, 640K bytes of memory, dual floppy disk drives and the overriding need to tie those PCs together. OS/2 and its forthcoming applications should be viewed by those buyers as an interesting stage in the PC's development. But for now, this vaporous flurry is largely a necessary business exercise carried out on the promise of an exciting future technology.

LETTERS TO THE EDITOR

Newsworthy or not

I spotted an interesting phenomenon in "Multiuser support in OS/2 plan" [CW, April 20]. The article says that multiuser capabilities will be available at some unspecified point in the future for the IBM Operating System/2, which will not be available before the first quarter of 1988. The article also states that "... a multiuser version of OS/2 may be years away ..." Yet in the same issue in the Inside Lines column, mention is made of a multiuser version of Apple Computer, Inc.'s Macintosh operating system.

To quote the article, "According to one source, the multiuser Finder will be announced concurrently with the May delivery of the Mac II, which he says is on schedule."

What I find so interesting is that speculation about a feature that may some day, but possibly not for years, be available for an IBM machine is so much more newsworthy than information about the same capabilities to be available in the next month for an Apple computer.

Paul Whittington
Director of MIS
American Society of Clinical Pathologists
Chicago

Chilling notion

Apparently, the author of "The pitter-patter of electronic footprints" [CW, March 16] finds nothing chilling in the notion that computer operations should routinely archive electronic mail traffic — as "any good computer systems operation must do."

The author entirely misses the concern of civil libertarians, who correctly worry that new technologies allow the government — or perhaps a curious systems operator — unprecedented access into the private records and, in this case, electronic correspondence of individuals.

I, too, am happy Lt. Col. Oliver North's letters on the White House's electronic mail system contained damning evidence about his rogue operations in Iran and South America.

But unlike the author, I am very troubled to learn those letters had been archived, no doubt without North's knowledge. Are my MCI Communications Corp. electronic letters archived? Frankly, I had never worried about this before. Now I do.

Even more troubling is the author's casual attitude and his unsatisfying conclusion that the potential for such invasions of privacy is "a small price to pay" if such surveillance can also help catch the bad guys.

Ellis Booker
Features Editor
Telephony
Chicago

This week in history

May 9, 1977
Love comes in mysterious ways. After several months of daily voice communications through Codex modems, and unable to be terminally separated any longer, Laura Gibson and Erby Norris, employees of National Gypsum Co. in Buffalo, N.Y., meet and are wed.

May 10, 1982
The Senate's Permanent Subcommittee on Investigations opens hearings for its on-going investigation into Soviet high-tech espionage in cloak-and-dagger style: A Soviet emigre testifies behind a protective screen about copying stolen American technology in a Soviet research institute, and a convicted spy flanked by armed federal agents claims he was seduced into serving communist operatives disguised as American businessmen and delivered advanced radar designs to the Soviet Bloc.

SQL standards

I would like to congratulate your publication for the attention given to relational technology and SQL. It is about time.

Thanks also to Richard Finkelstein for the good job he is doing of clarifying a lot of confusion and misleading information proliferating in the press [CW, April 20].

However, let me make two observations. First, the status of SQL standards — two of them, both weak and with extensions by vendors — is hardly inviting to judge by them, as Finkelstein recommends.

Second, he states that "The math functions [in SQL] are executable within the WHERE and HAVING clauses."

What he probably meant was "executable with the WHERE clause [for all rows SELECTed] and within the HAVING clause [for each of the groups of SELECTed rows defined with GROUP BY]."

Keep up the good work

Fabian Pascal
Micro-Pasqal
Washington, D.C.

The hazards of OS/2

Convincing novices that the PS/2 series micros are still personal computers

RUSSELL LIPTON

IBM finally dropped the other shoe with the announcement of Operating System/2, even if the shoe won't actually hit the ground for another year. The combination of new, semiproprietary IBM Personal Computers and a vaporware operating system is predictably producing mass confusion. There is no immediate relief in sight. This much, though, is clear. OS/2 spells big trouble ahead for personal computer end users.

Note that it is end users I specify, not, say, programmers. Unquestionably, the advent of a DOS that is moving, however slowly, toward departmental and mainframe connectivity is good news for MIS personnel who have gone nuts trying to arbitrate the micro marketplace. But for end users, the new DOS and the semiproprietary machines that will accompany it signal yet another agonizing cycle of retraining. In the end, the news is also bad for MIS, since it is MIS that will painfully retrain and reconnect its micro population just when, however awkwardly, a handle had been gained on their uncontrolled proliferation.

The problem is that end users don't want Advanced DOS; they want Primitive DOS, something rather like (shh . . .) the fabled primitive Apple Computer, Inc. Macintosh interface. What is happening instead is a collision between the concept of a personal computer appliance and a corporate workstation. Granted,

Continued on page 20

Lipton consults on software productivity in the U.S. and France with New York-based James Frame Enterprises Inc. He is currently writing books on expert systems and SQL based products.

Sleuthing the source of the sinister slump

Or, smugness goeth before a fall

GLENN RIFKIN

I've heard the slump is over. That's certainly a relief. Bad news can be like primordial ooze, spreading over everything in its path.

In the case of the computer industry, the bad news was especially unsavory, mostly because it was an industry naive in the ways of pessimism. This is an industry, after all, in which 21-year-olds become overnight multi-millionaires and 30% growth rates are a *disappointment*.

So when real bad news hits, chaos sets in. Chapter 11 was no longer simply the next chapter after Chapter 10 in "The History of Microcomputer Start-Ups." IBM had to find someone whose hand was not shaking so badly that he couldn't draw a downward line on the earnings chart. MIS managers were actually distracted from the Year of the Local-Area Network to face real questions about whether their vendor of choice would survive the shakeout.

And through it all, there was a profound sense of confusion. Why, I often wondered, did this slump begin, and why did it continue for so long? All the explanations about drops in capital spending, saturated markets and overzealous vendor hiring seemed vague and unfulfilling. There had to be more.

So I set out to discover the source of the slump. I put lots of questions to lots of people, and my sleuthing soon lead me to the door of Wallace J. Trendsetter, a little-known consultant based in Walla Walla, Wash.

Wally, it turned out, was an unassuming little man with thick glasses and a pasty complexion. He reluctantly invited me in and offered me a seat amid stacks of trade journals, newspapers, magazines and newsletters scattered around his cottage. His desk was barely visible under the mountains of paper, floppy disks and personal computer hardware.

"What do you want?" Wally asked through narrowed eyes.

"Well, Wally. All roads, it seems, lead to Walla Walla," I replied, doing my best Sherlock Holmes impression.

"I don't know what you mean," he lied.

"Oh, come on, Trendsetter," I said. "Don't be coy. It was you

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Rifkin is a Senior Editor at *Computerworld*.

Machines made in man's image

HARVEY NEWQUIST

Many innovations in the world of technology have captured the imagination and awe of the mass market: the first computers, hand-held calculators, Pong video games, the space shuttle. But none has been so in and out of the public fancy as robots.

From Robbie the Robot in "The Forbidden Planet" to the robot on TV's "Lost in Space" and on to C3PO in the "Star Wars" trilogy, robots have become more and more imbued with human capabilities, qualities and moralities.

We now take the robot for granted. It has become another in a series of metallic, gear-driven, lifeless pieces of hardware that buzz from place to place in factories. Robot arms and hands that act as spot-welders and painters are almost a way of life in the auto industry.

From depressed sales to too many competitors after a piece of a small pie, the robot industry, like the hard-hit auto industry, has been taking its share of lumps. Much of the robot market resides in the automotive or the electronics industries, both still depressed in 1986.

General Motors Corp. dealt the biggest blow to many robot manufacturers by canceling millions of dollars worth of contracts during the year. Its own IMF Robotics subsidiary laid off 200 of its 700 workers. Yet, the Robotic Industry Association reports that there are almost 30,000 robots installed in the U.S. That probably does not count the robotic toys you can buy at The Sharper Image or Neiman Marcus that can serve your after-work Bloody Mary.

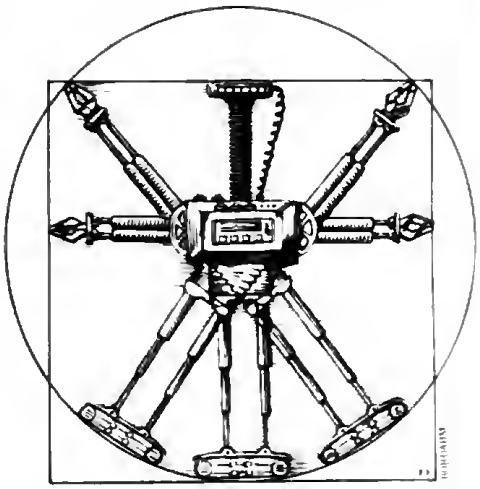
Despite the reality of robots as functional metal mechanisms, they still capture our imagination. The following examples are good illustrations:

Japan unveiled the Waseda University Robot, WABOT, at the Tsukuba International Science Exhibition in 1985. WABOT is capable of playing the piano — with the assistance of 67 computers. The machine features movable fingers, limited voice-recognition capabilities and preprogrammed speed that would make Vladimir Horowitz blush — WABOT's mechanical fingers can strike keys 15 times per second. The machine still lacks a little in emotional sensitivity, though.

I once heard Marvin Minsky, the director of MIT's Artificial Intelligence Laboratory, tell a story about how he invented a robot arm that behaved in a similar fashion to a human arm. Those who saw his creation felt it was just another piece of machinery and were unimpressed. Then Minsky put a shirt sleeve on the arm. That made an impression, and it also made a few people squeamish about the capabilities of machines. It seems appropriate that Detroit should someday outfit its robots with industrial jumpsuits or plaid flannel shirts.

A popular investigative news show did a piece on the Prowler, a mobile robot to be used for, well, prowling. Designed as a robotic soldier, it stirred up controversy for its ability to identify and shoot at trespassers while patrolling restricted areas. To some, using a robot in this way seemed like letting a rabid Doberman protect the front yard; to others, it seemed like an ideal area-surveillance tool with which even Wayne Newton would feel safe.

However, the Prowler could not protect its manufacturer, Robot Defense Systems, Inc., from creditors. As of January, the company is seeking protection under Chapter 11 of the Federal Bankruptcy Act.



Forced labor

Surprisingly, the word "robot" has been with us longer than most of us have been alive. It was first used in 1921 by the Czechoslovakian writer Karel Capek in his play, "R.U.R." (for Rossum's Universal Robots). "Robot" is derived from the Czech word for forced labor, "robota."

Capek's "R.U.R." dealt with the creation of robots that would take over the drudgery of human labor, allowing us to go about the task of perfecting ourselves.

It was Isaac Asimov who really brought robots to the public with his book, "I, Robot." Believed to have coined the term "robotics," Asimov lays down the Three Laws of Robotics:

1. A robot may not injure a human being or, through inaction, let a human come to harm.

2. A robot must obey the orders given it by human beings, except when such orders would conflict with the First Law.

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Unfortunately, even these fictional laws were violated within 40 years of their creation. On July 4, 1981, Kenji Urada was killed in Japan's Kawasaki Heavy Industries, Ltd. plant when a mobile delivery robot crushed him against a piece of equipment he was servicing.

Since that time, perhaps a dozen individuals have died in Japan due to robot accidents. On July 21, 1984, a man at Diecast Corp. in Jackson, Mich., was pinned to a factory pole by a robot. He, too, was performing a routine maintenance task. Although he was not crushed, the man did suffer a heart attack and died a week later. As far as I know, this death is the only robot-related fatality in the U.S.

So as you toil at your VAX or your Macintosh or even your Cray, remember that robots are mobile and active machines in the relatively passive environment of computer technology, where physical movement is usually limited to disk drives.

Robots are an important part of computer science and will become more important with the addition of knowledge bases and intelligent controllers. And who knows? If they gain enough intelligence, they might even be used someday to turn the letters on "Wheel of Fortune."

Newquist writes and consults on artificial intelligence and other advanced high technology topics from his office in Scottsdale, Ariz.

OS/2 hazards

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IBM doesn't want to sell commodity equipment, but end users really want, at heart, pocket computers, not miniaturized Crays (read "80386 chip"). In other words, they want the ease of use that comes with calculators combined with the power of a Cray.

The irony here is that powerful hardware and easy-to-use software are both directly and inversely linked. They are directly linked because the 80386-based machines and their successors make it possible to lavishly spend excess machine cycles in the delivery of transparent user interfaces. But they are inversely linked because the more powerful microprocessors make possible computing styles that can only be supported at present by highly sophisticated and complex software.

There is, in other words, a schizophrenic gap between the desire to provide top-down corporate computing and the inchoate employee desires for increased simplicity in their own relatively private work. Remember Visicalc in the early days of microcomputing? Now factor in the added power (and complexity) provided by Lotus Development Corp.'s 1-2-3. Extrapolate still further to Symphony. Symphony is and has always been way beyond the real needs of most users — the ideal product that no one wanted. If that is so, what about the proposed 80386 application software? Far too many developers seem entranced by the feasibility of turning PCs into miniature mainframes.

Unless the software vendors dedicate themselves to simplifying existing software. A strange thought, but why not? Wasn't that the rationale of HAL for 1-2-3? Let's put all that resource into making the power of 1-2-3 or Dbase III or Microsoft Corp. Windows more accessible and intuitive, more user-transparent, and forget about evermore elaborate PC tools.

The message to software developers is clear: If you need something more than Dbase on a PC, use the PC versions of Information Builders, Inc.'s Focus or Oracle Corp.'s Oracle. They already exist, so don't invent the wheel yet again. After all, one million-plus PC beginners (and millions more overseas) will be entering the market for the first time during each of the next five years. Imagine selling them a far better HAL for Dbase. The infant AI industry could make a killing providing front ends that do nothing more than anticipate the needs of neophyte end users.

Now, in fairness to IBM, the provision of a Presentation Manager for OS/2 and the endorsement of Windows is a significant and mature admission that the new operating system must be twinned with an intuitive Macintosh-like interface in order to gain widespread user acceptance. After all, IBM has end users, too. In any case, IBM's real challenge will be to persuade the millions of novices due to enter the market that the Personal System/2 and OS series micros are still personal computers.

This challenge is not only IBM's but the the entire microcomputer industry's. Three years after the introduction of the Macintosh, the world of personal computers is still struggling in near-chaos to adopt the simplified user interface that is the sole true genius of that machine. And now the near-chaos will be transformed into something resembling a nightmare — for end users.

Vendors had better beware. End users confounded the industry once before by buying Apple IIs so they could work on their own. They may surprise everyone now by insisting on remaining personal computer users and refuse to mutate into corporate computer professionals.

Slump sleuthing

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who started the whole slump now, wasn't it?"

Wally shifted uncomfortably in his seat. A stack of tractor paper slid to the floor from his desk like a Slinky.

"Well, yes, it was me," he finally admitted. He looked down in obvious shame.

"Why," I cried, "why would you do that to our beloved industry?"

Red-faced, Wally shifted between anger and remorse. "I was tired of it. I'd had enough. Everyone was getting fat and lazy; and worse, they were all getting smug. I hate smug," he declared.

"But how — ?" I began.

"It was easy. I sent my newsletter, 'Walla Walla Wally's Tracks and Trends,' out to a few key reporters and consultants back in late '84. I filled it with innuendo and insinuation. I plugged it with predictions of doom. I sounded authoritative. I pointed out that MIS had had enough — enough hardware but not enough solutions. I created an atmosphere."

"That's all?" I gasped, totally astonished.

"That's all it takes," he laughed sardonically. "And, boy, did I knock those birds off some high perches. There's definitely no more smug. I think they got the message."

"So what now?" I asked.

"Hey, now it's over. It was in the April issue of 'Tracks and Trends.' You must have heard something by now," he insisted.

"Well, yeah, there's talk that it's over, but . . ."

"Oh, it's over all right. Give it a few weeks. A seed takes time to sprout. But the gang has suffered enough, and I wasn't having any more fun with that one. Besides, I've got my eye on investment banking. Talk about smug."

Avatar

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SOFT TALK

Charles Babcock

Data machine to fade away?

A recent report from market research firm International Data Corp. (IDC) says data base machines, while an alternative to software data base systems, represent only a niche market that is going to disappear sometime in the 1990s.

This must come as somewhat of a surprise to companies like Teradata Corp. and Britton Lee, Inc.

Britton Lee is estimated to have doubled its revenue in both 1983 and 1984, slowing to a 36% growth rate in 1985 at $29 million and leveling off in 1986 at $30 million.

One of its biggest customers, surprisingly, is AT&T, which uses 100 Britton Lee machines in integrated-circuit design applications.

Teradata installations

Teradata is privately held, but is estimated to have shipped 44 of its large-system units in 1986 at an average price of $750,000, yielding an estimated $33 million in revenue. One of Teradata's noted installations is Citibank NA.

Teradata was founded in 1979 by a management team that came from Citicorp's Transactional Technology, Inc subsidiary, which developed the company's on-line banking system.

Both of these companies have produced hardware-based products that address some of the typical limitations of data

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Mail system dials in targets

BY ALAN J. RYAN
CW STAFF

WOBURN, Mass. — Direct marketers need to narrow down lists of millions of names to a set of prospects likely to purchase an item through the mail. Nobody said it would be easy.

But a developer of expert systems recently said it can offer assistance that incorporates the experience and know-how of 10 veterans in the direct marketing field.

More/2, an expert system developed by Persoft, Inc., is based on information gathered by company co-founders Richard Mueller and Mike DeVitto and eight others. It employs human-decision rules, Mueller said, but does not actually include mailing lists or customer information. Instead, it analyzes the information already present on a customer list and continues to analyze it as new information is added. It will rank the lists name by name — from the most likely to respond to a particular mail offering to the least likely — and becomes increasingly intelligent as more names and information are added to its files, Mueller said.

Persoft's primary distribution of the system is through service bureaus, and it is currently installed at five bureaus in the direct marketing industry, Mueller said a sixth will be installed soon. The system costs a service bureau $375,000.

Dale Ibis, product manager at May & Speh Inc., in Oak Brook Terrace, Ill., said that by using More/2, he is able to help his clients achieve a better response rate. "They're looking for a way to take lists and boost their re-

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Supra gets high relational grades

Users say Cincom DBMS's qualities, 4GL tool, data integrity beat DB2

BY JAMES A. MARTIN
CW STAFF

SAN DIEGO — Although no vendor can claim to have a fully relational data base management system, Cincom Systems, Inc.'s Supra comes close to fitting that description, according to users interviewed at Cincom's Cinteract annual users meeting held here recently.

The users said they chose Supra over IBM's DB2 because it offers more relational qualities and a fourth-generation language development tool and maintains better data integrity. Moreover, users said, Supra integrates well with IBM mainframe operating systems. Users also said it was easy to convert to Supra from Cincom's nonrelational DBMS, Total.

In addition, the announcements Cincom made during the conference — support for IBM's SQL and distributed data base environments — should help Supra maintain its edge in the marketplace, users said.

"Cincom has become a force to be reckoned with in the data base market," said Lee McGee, director of data base technology for Amex Life Assurance Co., a division of American Express Co. in San Rafael, Calif. Other data base management systems vendors have been left behind in their wake."

Cincom spokesman Ronald Hank said 210 to 225 licenses had been sold for Supra by the end of March. A total of 150 had

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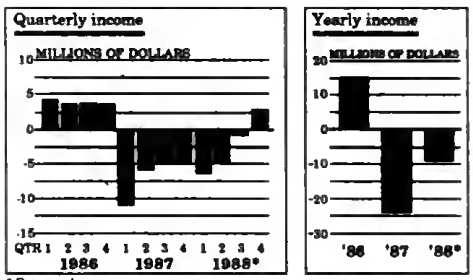
Data View

Cullinet Software, Inc. net income

Cullinet losses are projected to shrink in fiscal '88



* Estimated

INFORMATION PROVIDED BY ALEX BROWN & SONS, INC.
CW CHART

Excelerator tool expanded to include Vaxstation use

BY NINAMARY BUBA MAGINNIS
CW STAFF

CAMBRIDGE, Mass. — Index Technology Corp. has ported its Excelerator systems analysis and design software to Digital Equipment Corp. graphics Vaxstations running the VAX/VMS operating system.

Excelerator, which is a computer-aided software engineering package that was originally offered on the IBM Personal Computer and compatibles, allows multiple Excelerator users to share data in the VAX environment, according to Index Technology spokesmen.

Excelerator can provide DEC users with an integrated commercial systems development environment, according to Index

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Inside

SOFTWARE NOTES

PC software market shift predicted

The complexion of who sells software for IBM Personal Computers could change with the introduction of the Personal System/2 and possibly take on more of a mainframe vendor slant.

PS/2s will tend to segment the market into corporate buyers vs low-cost, low-margin individual purchases, the **"Computer Industry Gray Sheet"** recently predicted.

The corporate market will be addressed by IBM "and its competitors with the greatest technical expertise and deepest pockets," the industry newsletter added.

Fortune Systems Corp. has signed a joint agreement with **Unify Corp.** in Sacramento, Calif. Under the pact, Fortune Systems will port the Unify relational data base management system to Fortune's supermicro, the Fortune Formula.

Larry K. Geisel has formed **Intelligent Technology Group, Inc.**, in Pittsburgh after resigning as president and chief executive officer of Carnegie Group, Inc. The firm plans to offer knowledge-based products and has purchased the On-Line Services Division of Control Data Corp.

Britton Lee, Inc., the data base machine manufacturer, has signed volume purchase agreements worth $5 million with **NCR Corp.** and **Metaphor Computer Systems**, President David L. Britton said last week.

Syracuse University has received a $12 million federal grant to establish a **Parallel Architecture Center** to explore architectures and develop software for parallel processing.

India is boasting that it is becoming an exporter of software, thanks in part to its large pool of programmers who work "at one-half of the going international wage." Exports jumped from $850,000 in 1975 to $38 million in 1986.

Data bases

CONTINUED FROM PAGE 23

base management systems, particularly relational systems.

The data base machine separates data base management functions from the host processor, moving them to the storage side and away from the CPU side of the I/O constraint. The host processes the application, but SQL commands are handed off to the data base machine, which locates and manipulates the data in attached storage devices.

This approach has several advantages in addition to faster relational performance. The data base machine has freed the data from captivity by either an in-house application or a particular piece of host hardware. Any CPU running an application capable of interfacing with the data base machine can tap its data delivery capabilities.

The data base machine supplies more intelligence to storage management and retrieval, allowing a data base to be searched without loading it into host memory, researchers at Framingham, Mass.-based IDC note. This provides "a mid-life kicker" to traditional sequential processors.

With these advantages, why does IDC claim that the data base machine will disappear as a distinct product offering?

'Inelegance' before the fall?

The "inelegance of data base machine programming will keep the solution highly niched through the 1980s. In practicality, only for newly created applications and data bases can data base machines be justified today," the report concludes.

Sybase, Inc. is offering an intermediate solution — a relational software product that converts a Sun Microsystems, Inc. workstation into a data base machine. But IDC researchers think that both IBM and Digital Equipment Corp. are going to incorporate features of data base machines into their processors. IBM's "Project Jupiter" is attempting to rewrite the MVS operating system storage function. Relational DBMS functions could be moved into MVS and, in 1990, a post-3090 system could include an optimized, relational DBMS back-end processor, the report predicts.

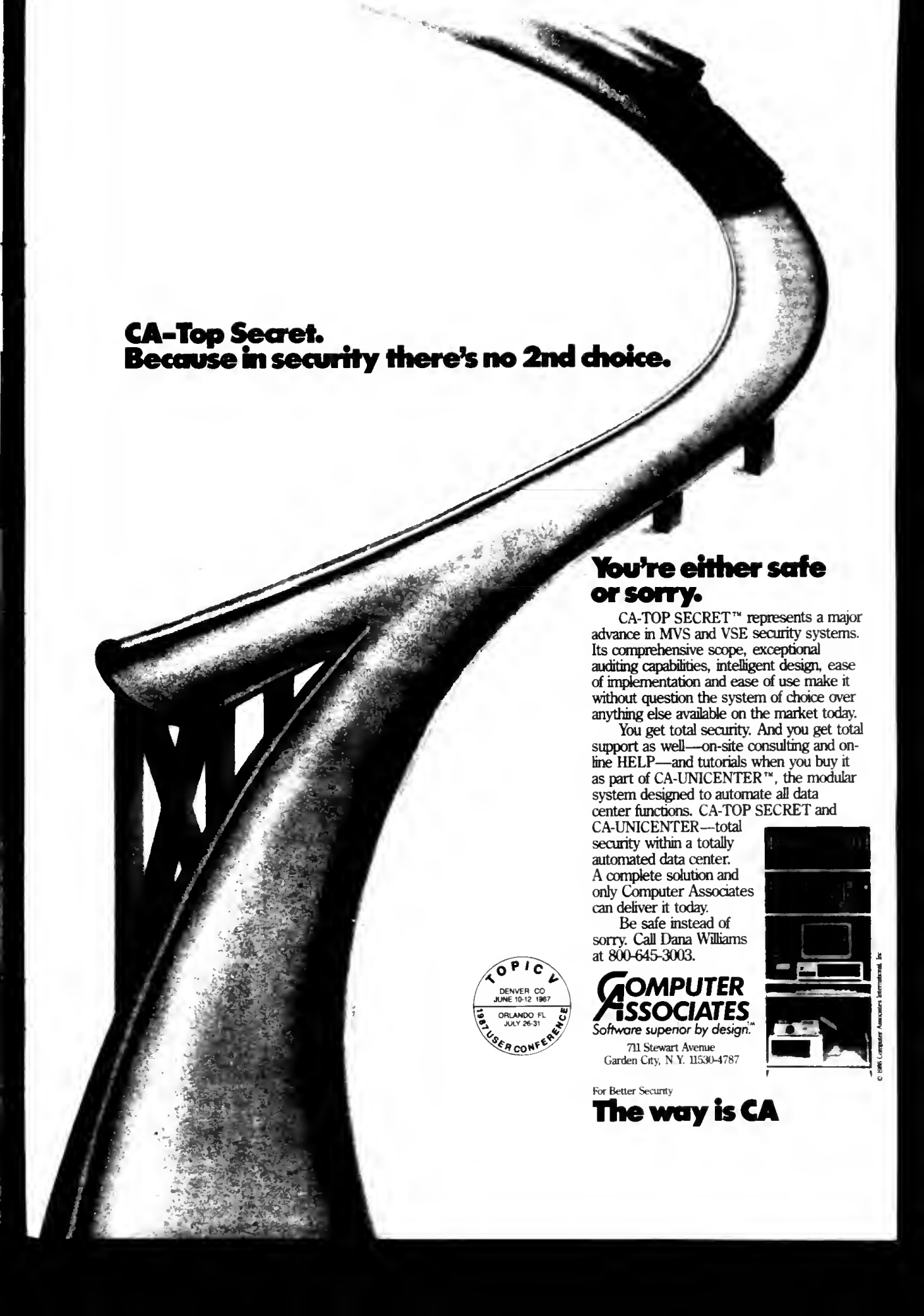
In the same vein, DEC can increase storage intelligence and enhance its VMS OS for greater relational data base functionality, while the loosely coupled Vaxcluster offers a multiprocessor approach to data base functions.

As more advanced programming techniques come into play, they will supply a front end for creating data base applications and a general-purpose appetite for optimized relational systems. The new techniques will employ English-language style programming, personal computer-oriented graphics and other user interfaces that spread out the appetite for data base use.

"In a sense, the current start-up suppliers are priming a product pump through which the established vendor's products will largely flow," the IDC report says.

That may be the case, but the pioneers may get lucky and find a way to expand what until now has been a narrowly defined niche.

Babcock is *Computerworld*'s senior editor, software & services.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Supra

CONTINUED FROM PAGE 23

been sold at the end of 1986, one-third of them to new customers, he added.

Several users cited Supra's three-schema architecture as a chief benefit. That architecture insulates the end user from the physical and logical structures in the data base. The three-schema architecture, along with the Relational Data Manager module, "allows us to change data structures without having to recompile our programming," said Donald G. Koontz, senior data base analyst for Allergan Pharmaceuticals, Inc. in Irvine, Calif.

"There were holes in DB2 in regard to data integrity," Koontz added. "You could change data in one view, and it might not change automatically in another, which is what relational is supposed to be about."

Supra's ease of use was a selling point for Floyd Vest, administrative project manager for Auburn University's Administrative Computing Service in Auburn, Ala. "From an applications point of view, Supra couldn't be much simpler to use as a data base," Vest said. "You don't have to worry about programmers not having the data base experience needed to use it. There's just not a lot of syntax to worry about."

Most problems encountered by Supra users were mentioned as minor or in the process of being eradicated in future Supra releases. Vest noted that data sequencing is particularly important in a relational data base, but that capability has only recently been enhanced with the latest Supra release, Version 1.3.

Adding support for SQL is a good idea, users agreed, since SQL is a marketplace standard, while Cincom's Spectra is a proprietary data access language. Any features offered by SQL "would have come normally into Cincom's products anyway," Amex's McGee said.

Support for distributed data base environments is of more interest to users, as the trend toward downsizing from mainframes continues. "The whole idea of networking and distributed data bases is going to be very important in the future," McGee said. "The bulk of our business contacts comes from American Express card-member mailing lists, so a distributed data base would be very helpful for us."

Cincom executives did not disclose when support for SQL and distributed data base environments would be available for The Information System/Extended Architecture family of products, of which Supra is positioned as the foundation.

Most users agreed that the ability to run most Cincom software systems on either IBM mainframes or Digital Equipment Corp. VAX minicomputers was another benefit to data processing shops. Supra runs on IBM mainframes, while a similar relational data base system, Ultra, runs on VAX machines. "The ability to run the same software on different hardware is very important," said Donald E. Wilson, business systems manager for Cubic Corp., a defense contractor in San Diego that runs a Vaxcluster of 8600 and 8700 machines. "It gave us a choice. Although most users gave Cincom high marks for incorporating suggestions into product releases, there were some complaints about delays.

"Cincom has not been able to maintain their schedules as tight as they could," Wilson said. He added that he was expecting a new engineering change control module for Cincom's Control Manufacturing software this summer but was told it would not be out until early 1988.

"Cincom has a lot going on these days, a lot being developed," Wilson said. "It's a matter of priorities and available resources."

Excelerator

CONTINUED FROM PAGE 23

Technology. The vendor's XL/Design Integrator software, for example, allows teams of Excelerator users to develop programs on multiple Vaxstations while concurrently sharing project and design data across a Decnet network. Under this application, the VAX would serve as a host, storing and analyzing data as well as producing batch-processed reports and other documentation, the vendor said.

Excelerator employs Vaxstation graphics capabilities such as DEC's UIS protocol for windowing. A "snapshot" feature allows users to simultaneously display multiple views of Excelerator data, the vendor said. Systems analysts, software designers and engineers can develop and revise systems diagrams and charts, validate and cross-reference design data and prototype screens and reports prior to coding, the vendor claimed.

The Vaxstation software package provides all the features of Excelerator Version 1.7, including the ability to work with Index Technology's Customizer. Customizer tailors Excelerator's dictionary and its user interface to work with an organization's specific design data, analysis routines and interface products, the vendor said. A Vaxstation version of Customizer will be available in June.

Excelerator costs $8,400 per copy and will be ready to ship this month.

Index Technology has also ported its Excelerator/RTS software to the Vaxstation. Excelerator/RTS was developed in conjunction with leading aerospace, avionics and process-control companies to meet the needs of engineers designing real-time embedded systems, the vendor said. Index Technology said it has sold 5,500 Excelerator licenses worldwide.

Mail system

CONTINUED FROM PAGE 23

sponse from 2% to 3% or 2% to 2.5%," he added.

The product's knowledge base is gleaned from the characteristics of individual customers on a particular mailing list, explained Mueller, president and chief executive officer of Persoft. Characteristics include such information as past purchase history and demographic or psychological information about the customer.

May & Speh has five clients who use the More/2 system to enhance their files, Ibis said. He added that while the system could be used in smaller applications, it is more practical for files in excess of 1 million records. "Generally speaking," he said, "the amount to be gained on a small file vs. what you'd have to pay to get rolling those fixed charges just simply don't make it cost-justifiable.

"I'd say a million records is what you'd have to have mailed several times a year at least" to make the most of More/2, Ibis added.

Mark Ryan, product manager for selection services at R. R. Donnelley & Sons Co. in Chicago, said that in order for clients to get the most out of More/2, the mailing lists should be greater than 100,000 names and that "they can be several million names."

> "I'D SAY a million records is what you'd have to have mailed several times a year at least" to make the most of More/2.
>
> DALE IBIS
> MAY & SPEH, INC.

Ryan said several factors play a part in the use of More/2. "The list size has to be big enough for you to statistically determine the attributes that are significant to a buyer. Gathering as much information about a customer, such as the kinds of purchases he has made in the past and when he typically buys, is crucial," he said.

"The philosophy is to eliminate the nonproductive prospects and concentrate on the ones that are productive," Ryan said.

He said his company, which installed More/2 about a year ago, currently has three clients who use it. "What we've done so far is probably categorized as testing and some production work, but the tests have been so positive that we're very optimistic," Ryan added.

For Bill Randall, CEO of Smartnames, Inc. in Waltham, Mass., More/2 is a useful tool for creating model customer lists. "The modeling process and back-testing in previous mailings using the model we derived through More/2 showed a very definite lift . . . somewhere in the 78% to 80% range for about 50% of the list. That's about what More/2 says you should be able to do with it.

"It works as advertised," Randall said.

For clients of the direct marketing bureaus, More/2 is an additional service, Ryan and Ibis said. It is not bundled in with other services or radically more expensive than other services.

Ryan said R. R. Donnelley runs the software system on one of the company's several IBM 4300 series mainframes and that he has had no problems to date. It has been up and running there for about a year.

May & Speh has been running More/2 on its IBM 3090 Model 400 for four months, Ibis said, adding that because it is menu driven, More/2 is easy to operate. "It's a little complex to describe to [a client]," he said. "That's probably the only drawback, although it's not really a fault. It's sort of technically complex, and if you try to reduce it to simple terms, it's not easy."

The users said there were few problems with the system. "I'd say of all the problems we've had [with More/2], probably half of them were new software bugs and the other half were our misuse or misunderstanding of it," Randall said. "It's been . . . reasonably trouble-free.

"The system will operate pretty much as advertised, but the users have to understand what they're doing. You can't just hand it to anyone and say, 'Here, plug your mailing list into it, as is, and you'll get these magical answers out.' It requires some skill," he added.

Randall said there are many techniques available for modeling. "I think More/2 is good or better than any of the techniques that I've seen." He said the "direct mail industry quite often expects magic when talking about modeling." The clients expect the modeling to either work magic or be a complete flop. "The result is usually somewhere in between."

"Only mailing over a period of time will a customer see the benefit of any statistical technique," Randall said. "The worst thing you can do [for a client] is build a set of false expectations."

Ibis said his customers have reacted favorably to the More/2 system. "Probably the most favorable reaction isn't so much result, but the ease of using it."

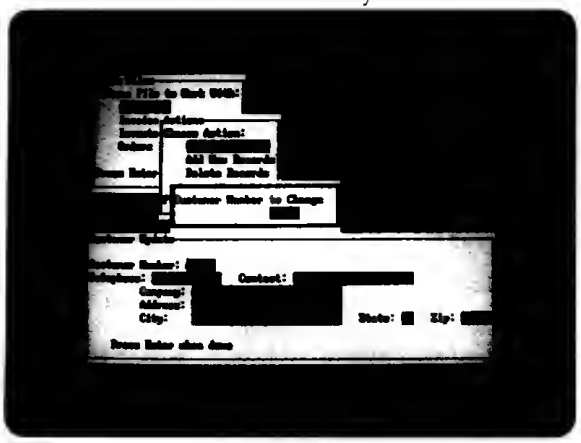
Through the system, direct marketers are reportedly able to predict the profitability of their mailings and evaluate the impact of their decisions before they mail, the company said.

"The hope is that it's going to make our customers more productive, so it gives us a higher value," R. R. Donnelley & Sons' Ryan said.

NOMAD WOULD LI
OF THE REASONS YOU BO

Product Inventory

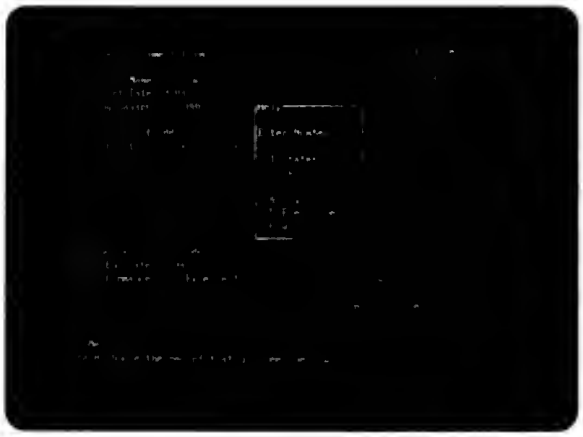
Executive Information System



Customer Information System

Sales Analysis

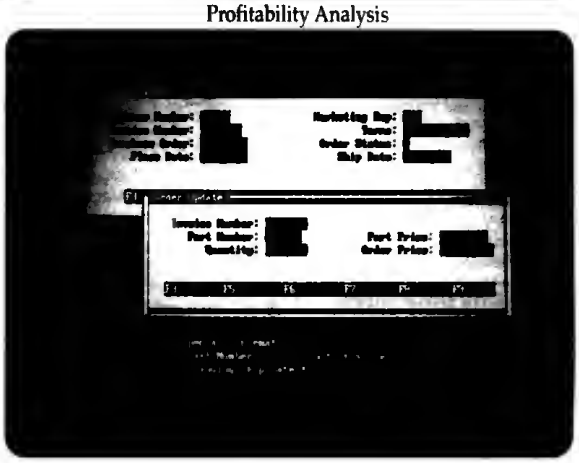
KE TO REMIND YOU UGHT SQL TO BEGIN WITH.



Human Resources

Profitability Analysis

Project Tracking



Order Processing

If you bought SQL in order to create applications like these, you'll be glad to know about NOMAD.

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It's a combination that will help your applications developers and end users in two ways. First, by increasing their productivity through NOMAD's powerful commands. Second, by letting them access data and create applications through interactive windows similar to those on a PC.

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For more information, write to Deborah Cox, at D & B Computing Services, 187 Danbury Road, Wilton, CT 06897. Or call (203) 762-2511. In Europe, call Pierre Jouanny in Paris: 33 (1) 42852552.

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NEW PRODUCTS

Systems software

Wang Laboratories, Inc. has announced an agreement with Desk Top Financial Solutions, Inc. in East Brunswick, N.J. to market the **Desk Top Financial Planning System** (DT/FPS) for the Wang Office Information Systems (OIS) product line.

DT/FPS is said to combine the capabilities of spreadsheets, data base management systems and financial modeling systems. It allows users to perform "what-if" scenarios without affecting the integrity of the core data. DT/FPS for the OIS consists of the Advanced Planning System and the Budget Reporting System.

The Advanced Planning System costs $2,995. The Budget Reporting System costs $1,995.

Wang Laboratories, One Industrial Ave., Lowell, Mass. 01851

Davis, Thomas & Associates, Inc. has upgraded its **DTA Recov** CICS/VSAM recovery system.

DTA Recov Version 2.0 includes enhancements such as the ability to specify files by selection criteria for either forward or backward recovery. According to the vendor, all types of VSAM files can be recovered and multiple journal files from different CICS regions can be merged onto one tape.

Other enhancements include the ability to invoke the sorting function from within DTA Recov and the ability to recover multiple VSAM files while CICS is operating. Also, all journal records can be printed during the journal backup or file recovery.

DTA Recov costs $5,600 for MVS and $3,800 for DOS/VSE/SP systems.

Davis, Thomas & Associates, 8800 Highway 7, Minneapolis, Minn. 55426.

Applications packages

Cadre Technologies, Inc. has announced **Teamwork/IM**, an information modeling module for its Teamwork series of computer-aided software development tools for workstations manufactured by Apollo Computer, Inc., Digital Equipment Corp., Hewlett-Packard Co., IBM and Sun Microsystems, Inc.

Teamwork/IM is a graphics-based, entity-relationship diagram editor based on industry-standard Chen notation. The data definitions associated with the entities and relationships can be automatically generated with user-configurable physical and logical attributes, the vendor said.

Teamwork/IM is priced at $3,600 as an add-on to other Teamwork products or at $8,900 as a stand-alone product.

Cadre Technologies, 222 Richmond St., Providence, R.I. 02903.

Lawson Associates, Inc. has added a series of integrated application software packages designed for city, county and state government use to its **Pinstripe** family of products.

The packages run on Unisys Corp. mainframe models B1000, B2000, B3000, B4000, V series, B5000, B6000, B7000 and A series. The packages include general ledger and modules, plus payroll, personnel and time accrual as well as accounts payable and purchase order.

Packages and modules are priced from $11,000 to $40,000.

Lawson Associates, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Languages

The **Thoroughbred Software Division** of Concept Omega Corp. has ported its **Thoroughbred Basic** to the NCR Corp. Tower 32/800 minicomputer.

Thoroughbred Basic is a multiuser application language. It can accommodate up to 128 users. Thoroughbred Basic is being bundled with Thoroughbred Passport, a software security device that plugs directly into any serial port on a computer system, either stand-alone or between the port and a terminal. It is said to allow users to tie software application to a particular hardware system via serial numbers that are burned into the application code.

Thoroughbred Basic for the Tower 32/800 is priced from $1,495 to $7,995.

Thoroughbred Software, P.O. Box 1035, 102 Old Camplain Road, Somerville, N.J. 08876.

Utilities

Computer Associates International, Inc. has announced **Masterpiece GRO**, a graphics reporting option for the IBM MVS and Digital Equipment Corp. VAX versions of its Masterpiece General Ledger application.

Masterpiece GRO is said to provide Masterpiece General Ledger users with a facility for producing ad hoc and production charts. It includes a collection of preformatted charts and graphs matched to general-ledger users' needs.

Masterpiece GRO for IBM MVS environments costs $25,000. For the DEC VAX, it costs from $7,500 to $12,000.

Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530.

Template Graphics Software, a division of Megatek Corp., has ported its **Blox/Template User Interface Management System** to equipment manu-

factured by Masscomp Co , Sun Microsystems, Inc., Silicon Graphics, Inc. and Digital Equipment Corp.

Blox/Template is a set of graphics-programmer productivity tools It is said to enable the user to prototype portions of an engineering or scientific graphics application and test it without writing code Features include a generalized graphics editor and an interactive screen editor.

Blox/Template is priced from $13,000.

Template Graphics Software, 9645 Scranton Road, San Diego, Calif. 92121.

Quickware Engineering & Design, Inc. has announced the introduction of Digital Equipment Corp.-compatible **diagnostic software programs** for its QED 11/85 CPU.

The eight programs were designed to report processor configurations, test CPU operation, verify floating-point operations, diagnose the cache memory and test line-clock and serial-line units. The products include programs to diagnose the operation of the QED 11/85 CPU board and diagnostic programs to test the memory.

The diagnostics are priced at $300 plus a media charge.

Quickware Engineering & Design, 139 Brighton Ave., Boston, Mass. 02134

Cincom Systems, Inc. has announced **XRef**, a cross-referencing facility for users of the vendor's Mantis fourth-generation application development system.

XRef is said to provide users with the ability to develop a complete listing and cross-reference of Mantis elements and entities It allows for cost-of-change analysis and provides an on-line list of all affected Mantis entities.

According to the vendor, features include cross-reference for all external VSAM files, all Total entities, files, elements and link paths, all Supra views for all DL/1 entities, call profiles and segment names; a list of all unreferenced entities, the ability to control which Mantis users and entities are processed; and the ability to build cross-reference files for specific users.

XRef costs from $3,000 to $5,000.

Cincom Systems, 2300 Montana Ave., Cincinnati, Ohio 45211

Data base management systems

Information Dimensions, Inc. has issued an enhanced release of its relational data base management system, **DM**

DM Release D2 is said to support domains, which enable the user to centrally define sets of value-specific element parameters, such as data type, size and legal patterns

Other features include a data base access capability that allows multiple kernels in Digital Equipment Corp Vaxclusters to simultaneously read a DM data base A utility, DMKMON allows DM users to monitor kernel activity and diagnose system performance via interactive menus

DM first-copy licenses are priced from $15,000 for supermicrocomputers to $43,500 for mainframes

Information Dimensions 655 Metro Place S., Dublin, Ohio 43017

Develapment tools

CGI Systems, Inc. has ported its **Pacbase** full life cycle applications generator to Honeywell, Inc and Unisys Corp systems.

The new versions allow Honeywell DPS-7, -8, -88 and -90 and Unisys 1100 mainframe users to utilize Pacbase to generate batch and on-line systems for any environment supported by Pacbase Pacbase is driven by a specification dictionary. It generates major Cobol production systems, including all code and documentation

Prices for the Honeywell and Unisys versions of Pacbase range from $149 000 to $299,000.

CGI Systems, P O Box 1645 One Blue Hill Plaza, Pearl River N Y 10965

Genrad, Inc. has introduced **ATG-32** software said to allow test programs for the company's 2270 series of in-circuit/functional test systems to be developed off-line on Digital Equipment Corp VAX-based computer systems

ATG-32 is said to enhance the capabilities of the test program development software It uses a menu-driven user interface to control and direct access to automatic and interactive utilities to generate test programs. According to the vendor, the product can generate programs for printed-circuit boards with very large-scale integration designs

Prices for ATG-32 begin at $30,000

Genrad, 300 Baker Ave., Concord, Mass. 01742

Information Research Associates has upgraded its **Performance Analyst's Workbench Systems** (PAWS) and **Graphical Programming of Simulation Models** (GPSM)

PAWS 3.0 is said to provide a simulation package for performance modeling of computer and communications systems GPSM 2.0 is a graphical interface to PAWS said to allow users to build concise graphical models

Features of PAWS 3.0 include support of submodels and seven new probability-distribution functions GPSM 2.0 can automatically translate graphs into the PAWS 3.0 simulation language

PAWS costs from $19 900 GPSM costs from $5,000

Information Research Associates 911 W 29th St Austin, Texas 78705

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2 **Connectivity.** With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus the SAS System reads data from any kind of file, including dBASEII,® dBASEIII,® and Lotus® 1-2-3.®

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The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II,™ Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

MICROCOMPUTING

SMALL TALK

William Zachmann

Get with the program

In looking at the myriad of microcomputer hardware and software products required to do this column, I still find that I've got some amazing blind spots at times. A recent example is Peter Norton's newest versions of The Norton Utilities: Version 4.0 and the Advanced Edition.

To tell the truth, it didn't even occur to me to think of writing about the products. My only thought in opening the package was that maybe they'd be helpful in solving a problem I'd been having in trying to install the new IBM PC-DOS 3.3 on an NEC Corp. APC IV.

Norton's Version 3.0 had been a mainstay in my utilities directory since it had come out. Like his books, Version 3.0 had proven itself to be of tremendous value to me. My hidden assumption, however, was that everybody already knew about the Norton Utilities and how handy they were.

My only concern was figuring out why it was that when I tried to do a PC-DOS 3.3 SYS.COM — to replace the Microsoft Corp. MS-DOS 3.1 that came with the NEC system with PC-DOS 3.3 — I got a message saying, "No room for system on destination disk." I'd had no such problem on the Tava U.S.A., Inc., my office system.

Continued on page 38

Compaq beefs up Deskpro 386

BY ED SCANNELL
CW STAFF

HOUSTON — Compaq Computer Corp. has enhanced its Deskpro 386 with disk caching abilities and Intel Corp.'s 80387 math coprocessor, allowing it to run applications up to five times faster than 8-MHz Intel 80286-based systems containing 80287 coprocessors, Compaq officials said recently.

The disk caching feature, when combined with the fast access times of the 40M-, 70M- and 130M-byte fixed disks used with the three models of the Deskpro 386, enables users to spend less time waiting for data to be retrieved in disk-intensive applications like graphics, data bases and accounting packages.

Compaq's decision to put disk caching in the Deskpro 386 was in direct response to similar capabilities included in IBM's recently announced Personal System/2 Models 50, 60 and 80. Compaq said it hopes to flatten any momentum the Personal Systems may build during the next several months as they are released by IBM.

Sales booming

Compaq said sales of the Deskpro 386 have been strong during the first nine months of the product's availability. The company has sold approximately 35,000 systems since Deskpro was released last September, a spokesman said. He added that most of the systems were being purchased for personal and work group applications such as design, engineering, network file servers and software development.

"These enhancements strengthen Compaq's performance leadership position in the industry-standard PC workstation arena," said Mike Swavely, Compaq's vice-president of sales and marketing.

Users can choose to install the disk caching program, which should improve system performance by up to 50% depending on the type of applications being used, Compaq said.

Once installed, the program remains resident to manage a

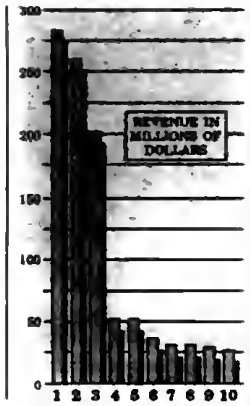
Continued on page 37

Data View

The rich get richer

The top three microcomputer software companies push away from the pack

1. Lotus Development Corp.	$282.9
2. Microsoft Corp.	$260
3. Ashton-Tate	$203
4. Autodesk, Inc.	$52.3
5. Wordperfect Corp.	$52.2
6. Microprо International Corp.	$35.8
7. Electronic Arts	$30.1
8. Borland International	$30
9. Digital Research, Inc.	$29
10. Activision, Inc.	$26.3



INFORMATION PROVIDED BY SOFT LETTER
CW CHART

It's all done with mirrors

BY ED SCANNELL
CW STAFF

MANCHESTER, N.H. — Softlogic Solutions, Inc. has introduced a memory-resident program that permits users to automatically reformat and transfer data between incompatible programs, including Lotus Development Corp.'s 1-2-3.

Called Magic Mirror, the product allows users who feel limited by all-in-one integrated programs to choose from a broad range of Microsoft Corp. MS-DOS-compatible applications, a company spokesman said.

The product was designed to eliminate the time-consuming need to retype data manually, a spokesman said. Consequently, it helps maintain the integrity and accuracy of data during the

Continued on page 35

Pumping iron in PC market

BY MICHAEL SULLIVAN-TRAINOR
CW STAFF

BOCA RATON, Fla. — IBM is flexing its manufacturing muscles in an attempt to gain a competitive advantage in the personal computer market. Unlike its predecessors, the Personal System/2 models were designed to take full advantage of IBM's own plants and technology rather than those of other vendors.

"The major difference between the Personal System/2 and the former Personal Computer line is that the rest of the IBM corporation wanted to play, and internal organizations were extremely responsive, bringing their resources, technology and best people to bear on getting this to happen," says Dennis Andrews, systems manager for the PS/2 Models 50, 60 and 80.

According to Andrews and Lucian Bifano, systems manager for the Model 30, the involvement of the entire IBM corporation is orders of magnitude greater for the new line than it was for the old. Evidence of this approach is seen in the number of other plants involved in manufacturing the PS/2s. All of the models are assembled in the En-

Continued on page 37

Inside

Let your fingers do the walking

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — Users of Ashton-Tate's Dbase III data base software will be able to locate more than 1,000 third-party products and services through The Developer Registry, a $25 catalog from Ashton-Tate that is scheduled to be announced today.

The registry is aimed at helping users locate products to suit specific needs, such as vertical market applications built around Dbase. Rather than a corporation developing an application with Dbase, one may already exist that would be supported and updated by its developer. Ready-made vertical and custom applications save users time and often result in cost savings.

"There are a tremendous number of requests from users for access to organizations that help them use Ashton-Tate software more effectively," said Mark Whiteside, manager of developer services for Ashton-Tate.

The Developer Registry also provides listings of utilities and hardware products that work effectively with Ashton-Tate software.

Framework applications

Also included in The Developer Registry are applications and services tailored for Framework II, Ashton-Tate's integrated software. Like Dbase, Framework contains a programming language and has been the core of numerous custom applications. Products that work with Ashton-Tate's line of graphics software, Multimate word processing, Rapidfile, Dbase II, and Dbrun II, a runtime version of its database software, are also included.

The Developer Registry will reportedly be updated every six months and provide full-page descriptions of each product and service listed.

It is said to be indexed by industry, geographic region, function and 15 other categories. Interested users can contact the developer directly to purchase the product.

Consultant listings include information on specific markets and products supported as well as supported architectures, such as mini and mainframe computing systems. End-user references for the consultants are generally available, the vendor said.

Ashton-Tate authorized computer dealers will have access to The Developer Registry and can help users locate particular applications or services, the firm said. Ashton-Tate makes no guarantees that firms listed will to customer inquiries.

The Developer Registry is available through Ashton-Tate dealers, bookstores and directly from Ashton-Tate.

Plus unveils 40M-byte PS/2 board

BY ED SCANNELL
CW STAFF

MILPITAS, Calif. — Plus Development Corp. has introduced a 40M-byte hard-disk expansion board for IBM's Personal System/2 Model 30. The company claimed the product is the first expansion board to offer 40M bytes of storage.

The Hardcard 40 supplies users with ample storage to run disk- and memory-intensive applications such as graphics and large data bases, a spokesman said.

Because it uses only one slot, the Hardcard 40 permits more room for expansion boards such as modems, graphics and network boards, he noted.

The product is attractive to users not only as an upgrade but as an option at the point of sale, according to Steve Berkley, Plus Development's president.

"The quality and price of Hardcard 40 are very attractive when compared with the manufacturer's drive. Compaq Computer Corp., for example, charges $1,500 for its 20M-byte drive," Berkley said.

Hardcard 40 offers twice the capacity of the competing Compaq drive for $300 less, according to Berkley.

Purchasers of new computers are expected to buy the majority of Hardcard 40s. Because many experienced users buy systems with disks already installed, Plus Development said it is advising its dealers and direct sales force to offer Hardcard 40 as an original option.

Plus Development said it will continue to make the Hardcard 20 available for $895. The Hardcard 40 is available for $1,195.

Aries adds CAE station

BY DOUGLAS BARNEY
CW STAFF

LOWELL, Mass. — In an effort to lower the cost of its micro-based mechanical computer-aided engineering workstations, Aries Technology, Inc. recently introduced the $21,850 Aries AT1100 Conceptstation.

The product, which is based on an IBM Personal Computer AT, allows users to capture, analyze and model product designs. The Conceptstation uses two CPUs and the Intel Corp. 80286 microprocessor that comes standard with the PC AT coupled with a 5 million instructions per second graphics engine. The graphics engine is housed in a separate AT-style case. The product runs under Microsoft Corp.'s Xenix.

The Aries AT1200 Conceptstation sells for more than $30,000 and includes an 8-million floating-point operations per second array processor, giving it four to 10 times the speed of the AT1100. The AT1100 is upgradable to the AT1200, Aries said.

According to Larry McArthur, president of Aries, the product is entirely menu- and mouse-driven and was designed to be accessible to the occasional, as well as serious, user.

Mountain tailors drives for PS/2, Mac

SCOTTS VALLEY, Calif. — Mountain Computer, Inc. has modified several of its disk- and tape-drive products to make them compatible with the IBM Personal System/2 and has tailored three of its disk-drive products for Apple Computer, Inc.'s Macintosh Plus, SE and II.

For the PS/2 Model 30, the company announced a Drivecard integrated disk drive and controller in 20M- and 30M-byte capacities, costing $850 and $995 respectively, and a Micro Bernoulli unit with a single or dual 20M-byte removable-cartridge disk drive, costing $2,195 and $2,895, respectively. Tape products for the Model 30 include the 40M-byte TD4000 external tape drive, priced at $895, the Filesafe Series 7000 60M-byte drive, costing $1,895, and 120M-byte tape storage units priced at $2,395.

The TD4000 tape drive, which comes with its own power supply, is also available for the PS/2 Model 50, as is a $749 version that uses the computer's power supply. Both internal and external versions of the drive are also offered for the Models 60 and 80. The Micro Bernoulli units can also be used with the Model 50.

To keep in line with falling system prices, Mountain reduced prices on all of its TD4000 units by $200.

Also for the Macintosh machines are the Micro Bernoulli box in single ($1,895) and dual ($2,695) 20M-byte removable-cartridge versions and the Micro Bernoulli Combo. Priced from $2,695 to $4,495, the Combo units come with 20M bytes of removable storage capacity and a choice of hard disk drives.

Mirrors

FROM PAGE 33

transfer process.

Once Magic Mirror is loaded into memory, users can highlight the data to be transferred. The product then automatically captures and stores each block of data in a memory buffer. Information in the memory buffer is limited in size only by the amount of free disk space, a spokesman explained.

With the target running, users can instruct Magic Mirror to transfer any or all data stored in the memory buffer. The product sends the data as if it was coming directly from the keyboard.

For example, if a user wanted to send information from a word processor to a spreadsheet, he would highlight the text to be transferred, which would store it in the memory buffer.

Next, Magic Mirror would use a series of style-control procedures from its library to reformat the word processing text into keystrokes that match the data structure of the spreadsheet. If none exists, users can create and save a style-control procedure.

Magic Mirror runs on IBM and compatible computers that have at least 256K bytes of random-access memory. The program's code takes up 48K bytes.

The product is priced at $89.95 and will be available in June, a spokesman said.

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SOFTWARE AG
PROGRAMMING BUSINESS SUCCESS

PC market

CONTINUED FROM PAGE 33

try Systems Division plants in Boca Raton, Greenock, Scotland, and Wangaratta, Australia.

But the key components — particularly the planar boards containing custom chips — are manufactured in IBM's plant in Austin, Texas. Other boards and the keyboards are manufactured in Lexington, Ky. The hard files are manufactured in IBM's Rochester, Minn., intermediate-size direct-access storage device plant, while a plant in Yasu, Japan, manufactures the adapter and controller cards.

Aside from the CPUs, which are supplied by Intel Corp., the only major parts made by outside vendors are the power supply, general mechanical and diskette assemblies.

"In a lot of cases, the only places where there was a clear availability of function and technology were IBM sources," Andrews says. "Quality is a major factor. We knew it was necessary to take a quantum leap in quality. We knew how to measure it, and we knew we could expect it from some of the IBM facilities."

Although IBM has sophisticated chip manufacturing capabilities, the PS/2 designers decided to stay with the Intel chips to make the new systems compatible with past IBM PCs.

"We like the architecture of the microprocessors we're using, and we have put a set of custom support chips around that microprocessor," Bifano says.

The emphasis on a compatible processor and custom-designed support chips allows IBM to take advantage of its advanced automation capabilities and its current production facilities. Both the technology — which relies on the surface-mount production of circuit boards — and the efficiency of plants that can produce multiple models on a single line have helped reduce production costs.

"We put a whole new [PS/2] production line together to provide efficiency for manufacturing operations," says Richard Daubenmire, Boca Raton site general manager and Entry Systems Division vice-president for manufacturing.

"The process is oriented toward being able to handle any of the different models or varieties of product in the same manufacturing line so we don't have to worry about having the proper capacity at the right place at the right time," he adds. The Boca Raton facility, which also makes PC ATs and XTs, has dedicated production lines to making all the PS/2 models. New techniques — such as continuous flow manufacturing — have been implemented on the lines within the last year.

Currently, the lines are nearing full production on Models 30 and 50, which have already been offered to the market.

"We're pretty close to being there on the first model of the 60, and you've seen our announce dates on the balance of the line, so I think you can draw your own conclusions from there. It takes a period of time to ramp up," Daubenmire says.

AST brings 80286 power to PCs, XTs

IRVINE, Calif. — AST Research, Inc. last week announced the Hot Shot/286, a 10-MHz accelerator card said to provide the processing speed of an Intel Corp. 80286 microprocessor for Intel 8088-based IBM Personal Computers, PC XTs and compatibles.

Hot Shot/286, available in June for $645, is a half-size card featuring a 10-MHz 80286 microprocessor that coexists with the microcomputer's original 8088 chip for software compatibility. With a software-controlled hot key, a user can choose to run an application at the 8088's standard speed of 4.77 MHz or at 10 MHz, AST said.

The accelerator card is said to work with AST's Enhanced Expanded Memory Specification (EMS) products.

Hot Shot/286 reportedly accelerates all IBM PC-DOS and Microsoft Corp. MS-DOS applications, including Enhanced EMS versions of programs such as Lotus Development Corp.'s 1-2-3.

In addition, AST announced enhanced versions of its 5251/11 and 5251/11 Plus emulation boards. The new versions are priced the same as the original boards, at $895 and $995, respectively, and are said to support IBM 5251 Model 11 and IBM 5291 and 5292 Model 1 terminal emulation for communicating with IBM's System/34, 36 and 38 minicomputers.

Deskpro 386

CONTINUED FROM PAGE 33

portion of random-access memory as a buffer between the computer and its fixed disk, a Compaq spokesman explained.

The system's 80387 coprocessor provides faster execution of floating-point calculation-intensive tasks. All Deskpro 386 models will now include sockets on the system board for both the 16-MHz 80387 coprocessor and an 8-MHz 80287 coprocessor, the company said.

Users of existing Deskpro 386s can receive an upgrade that includes a new system board with the 80387 installed at a price of $999. The company said that chips and upgrades may be in limited supply during the next two or three months.

The program

CONTINUED FROM PAGE 33

The error message wasn't good news. If I couldn't find a way around the problem, I might have to reformat the hard disk on the APC IV. I had a variety of tools that enabled me to read and modify the hard disk, including Version 3.0 of the Norton Utilities. However, to do so would have required manually working out various system-table formats. I thought the Advanced Version of Norton Utilities might make the task a little easier than it would have been otherwise.

I wasn't disappointed. One of the enhancements to Norton's basic disk-manipulation program is a greatly improved facility for reading and editing the boot record, file allocation table and system area of the disk. It took only a little sleuthing around to deduce that the PC-DOS 3.3 SYS.COM routine might not like the fact that the two hidden system files on my C disk were named IO.SYS and MSDOS.SYS instead of IBMBIO.COM and IBMDOS.COM.

Using the directory editor in the Advanced Edition made it easy to simply rename the two files in question. SYS-.COM changed its mind about whether there was room for the PC-DOS 3.3 system files. Now both the APC IV at home and the Tava in the office are happily running the latest version of PC-DOS.

Only a day or so later did two significant insights show themselves to my rather slow-witted mind. First, it might not already be obvious to users what a tremendously useful tool the Norton Utilities are, and second, the Advanced Version (and Version 4.0) is a big step forward in making the program more useful. As a result, I decided to write about these programs this week.

Program differences

There are basically three differences between Version 4.0 and the Advanced Edition. In the first place, the Advanced Edition contains some rather powerful additional features for manipulating system data on a disk. In the second place, it includes a copy of the Norton Disk Companion, a booklet that describes how data is organized on a disk. Finally, the Advanced Edition, with a list price of $150, costs a little more than the new Version 4.0 (at $99.95). In all other ways they are identical.

The Norton Utilities are actually a collection of several programs, with Norton Utilities being the main program. It is a tremendously useful program for exploring and manipulating data on disks. You can search for particular data, see a map of the entire disk usage, manipulate data on the disk, restore previously erased files and so forth.

In the Advanced Edition, Norton Utilities contains new directory editors, a file allocation table and a partition table as well as facilities for bypassing PC-DOS's logical organization in working on damaged disks at the cluster or sector level. It also provides disk access by absolute physical-sector address.

Other facilities of the Advanced Edition are two programs called Speed Disk and Format Recover. Speed Disk reorganizes the entire disk to minimize access times by eliminating fragmented files. Format Recover can be used to recover an entire hard disk after an accidental FORMAT.

In general, the extra features of the Advanced Edition are best left to those who know how to implement and use disk organization. Improperly used, the extra features could result in a badly scrambled disk.

Many of the other features of the Norton Utilities that are common to Version 4.0 and the Advanced Edition can be safely employed by a wide range of users. Directory Sort sorts directories by any desired combination of file name, file extension, date of file creation, time and/or size in ascending or descending order. It alone is worth the price of the package for anyone who likes clean, neatly arranged disk directories.

System Information summarizes the system configuration information on the system. In addition, it provides relative performance indexes of the processor, hard disk and overall system relative to an IBM Personal Computer XT.

Other features let you hunt for a particular file across all directories, edit or change the volume label on the disk, control screen or file attributes, set timers, print files in a versatile manner with formatting control, see how big files are and how much unused space they occupy, test the disk and restore erased files.

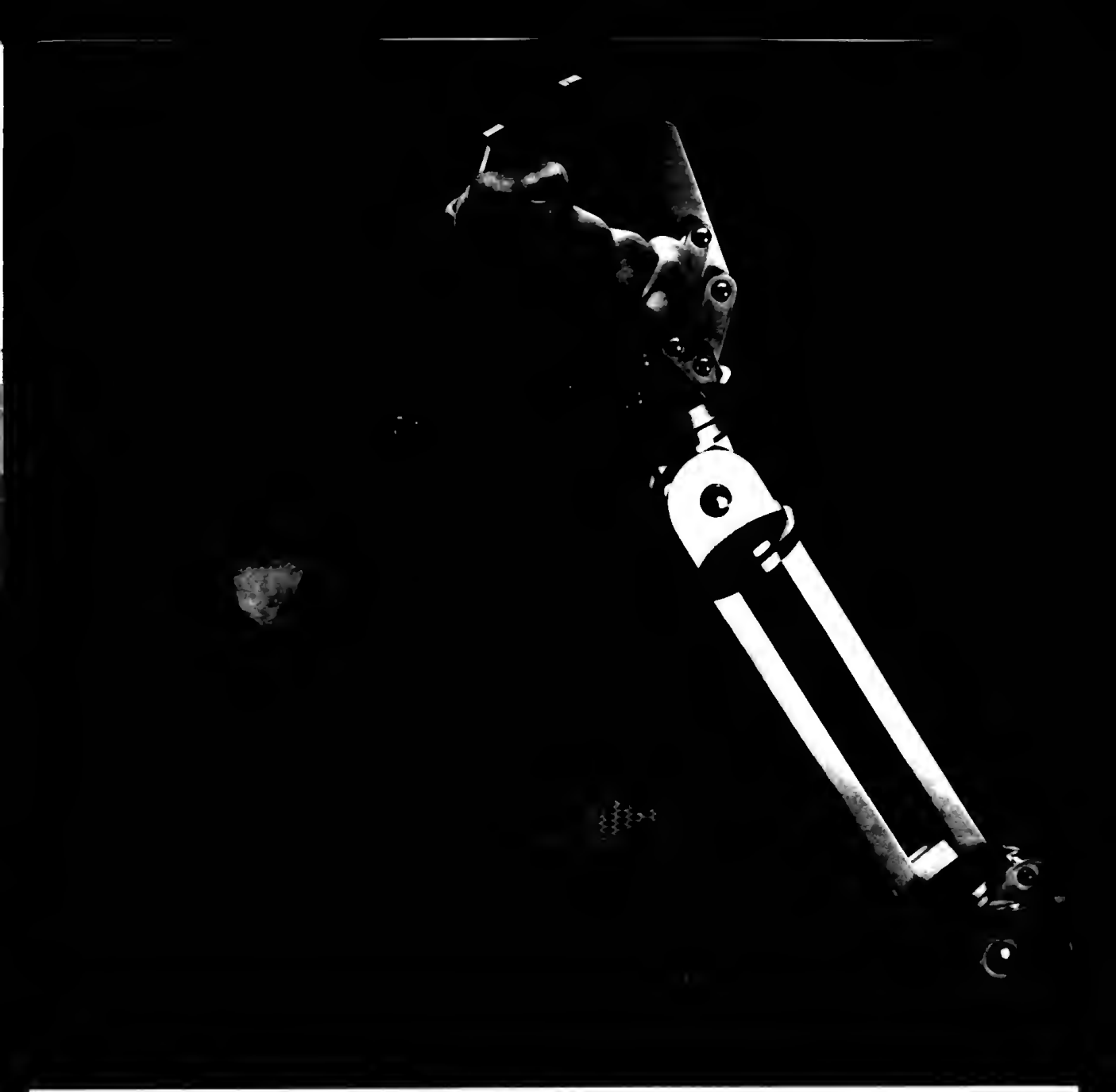
New capabilities

New capabilities with these two versions are ASK, which makes it easy to ask for and act on user replies from a batch file, a facility to append up to a 65-char. description to each file; and a facility for navigating and changing directories.

In addition, Version 4.0 and the Advanced Edition include a new Norton Integrator program that provides on-line help as well as a directory of all the utilities. It is much easier to use them than the older versions since it is no longer necessary to remember the names of the individual utilities and what they do.

In my opinion, the Norton Utilities aren't just good, useful programs. They are absolutely essential basic tools that ought to be in the tool kit of anyone who uses an IBM PC or compatible. I can't imagine how anybody who fits that description could live without them.

Zachmann is vice president of research at International Data Corp.



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NEW PRODUCTS

Systems

Epson America, Inc. has announced the **Equity I+** IBM Personal Computer XT-compatible microcomputer.

The Equity I+ offers increased power from its 4.77- and 10-MHz switch-selectable Intel Corp. 8088 microprocessor, five full-size expansion slots and front-panel controls. It comes with 640K bytes of random-access memory, a clock/calendar, 3½-in. floppy disk drive support, built-in Centronics Data Computer Corp. parallel and RS-232C serial ports and Microsoft Corp.'s MS-DOS operating system and GW-Basic.

Three configurations are available: single floppy disk, dual floppy disks or single floppy with a 20M-byte internal hard disk.

Prices start at $1,095.

Epson America, 2780 Lomita Blvd., Torrance, Calif. 90505.

Alpha Micro Co. has announced its **AM-1200** series of multiuser, multitasking supermicrocomputers.

The AM-1200 series is based on the Motorola, Inc. 68000 microprocessor and employs Alpha Micro's proprietary Amos operating system. Features include an IBM Proprinter-compatible parallel printer port; the ability to connect either five or 13 users to a single supermicrocomputer; 1M byte of standard on-board memory expandable to 4M bytes; and 20M, 35M or 70M bytes of hard disk storage.

The AM-1200 line is priced from $8,300.

Alpha Micro, 3501 W. Sunflower Ave., Santa Ana, Calif. 92704.

State of the Art, Inc. has introduced a **Bank Reconciliation** module for its Master Accounting Series 90 (MAS 90).

The Bank Reconciliation module is said to integrate bank reconciliation and cash flow analysis with the MAS 90 accounts receivable, accounts payable and payroll modules.

The module is said to handle up to 36 separate bank accounts, tracking checking and deposit activity. It can also generate reports for estimated future cash flow based on accounts receivable, accounts payable and payroll data.

The Bank Reconciliation module is priced at $195.

State of the Art, 3191-C Airport Loop, Costa Mesa, Calif. 92626.

Archetype, Inc. has announced its IBM Personal Computer AT-based **Archetype Designer** series of interactive page-makeup software packages.

Archetype 1 features Digital Research, Inc.'s Graphics Environment Manager-based interface for codeless typography, on-screen outline fonts and compatibility with such typesetters and printers as Compugraphic Corp. and Adobe Systems, Inc. Postscript. Archetype 2 adds on-line interfaces to the typesetting systems.

The software is said to output full camera-ready pages. Features include automatic or manual character-pair kerning, full tracking, 100th-point leading, variable set-width runarounds, automatic text flow between columns and pages and foreign language support.

Archetype Designer series packages are priced from $3,495.

Archetype, 145 South St., Boston, Mass. 02111.

DBI Software Products, has announced **The Mortgage Calculator**, software for use on IBM's PC-DOS, Microsoft Corp.'s MS-DOS and CP/M microcomputers.

The Mortgage Calculator is said to allow users to simulate "what-if" situations for conventional, variable rate and balloon rate mortages. It also prints amortization schedules for all three.

The software is written in Basic and comes on one floppy disk. A 132-col. printer is required.

The Mortgage Calculator costs $49.95.

DBI Software Products, 206 W. Michigan, Mt. Pleasant, Mich. 48858.

Multisoft has announced **Do-Re-Me**, an integrated system for Apple Computer, Inc. Apple IIe and IIc users.

Do-Re-Me consists of an electronic spreadsheet, word processor and a data base management subsystem. Also included are a report writer, a mail merge program and desktop accessories. Features include on-line Help and a pop-up menu user interface.

The user can import and export data. Do-Re-Me provides 35 text-formatted embedded commands and 38 built-in math, business, date and logical functions.

Do-Re-Me is priced at $49 plus $5 for shipping.

Multisoft, Box 5J, 120 E. 90th St., New York, N.Y. 10128.

Solutions International has introduced an Apple Computer, Inc. Appletalk network version of its **Glue** software for the Macintosh personal computer.

Glue software is said to allow users of different applications to share work. The network version is said to allow everyone on a network to access documents created by applications such as Excel, Pagemaker and Cricket Graph.

The network version of Glue includes a multilaunch version of the Glue Viewer,

which is kept on the file server, and the Imagesaver print-to-disk printer driver.

Glue Viewer can be used simultaneously by any number of workstations, the vendor said. Also, the same Imagesaver spreadsheet or newsletter can be accessed by multiple users at the same time.

Glue is priced at $250.

Solutions International, Box 989, Montpelier, Vt. 05602.

Accuquest Corp. has announced **Verisim**, software designed to assist users in decision making.

Verisim allows users to structure a problem, define the behavior of the controlling factors and find solutions. Verisim is based on random sampling. It can be used as a stand-alone application or to generate key data inputs for spreadsheets or project schedules.

Verisim features a menu-driven format, on-screen instructions, on-line Help and a user's manual. It runs on IBM Personal Computers.

Verisim costs $179.

Accuquest, 11911 Brighton, Stafford, Texas 77477.

Software utilities

Iotel Corp. has introduced the **C-96** compiler for its 8096 family of 16-bit microcontrollers.

The C-96 compiler is a single-pass compiler. Object modules produced by C-96 are fully linkable with PL/M-96 and ASM-96 object modules. It combines an American National Standards Institute standard front end with an optimizer and code generator developed specifically for the 8096 architecture, according to the vendor.

The C-96 compiler runs on the IBM Personal Computer, XT, AT or compatibles. It costs $750.

Intel, P.O. Box 58065, 3065 Bowers Ave., Santa Clara, Calif. 95052.

Frontrunner Development Corp. has announced **Topdos**, an integrated IBM PC-DOS and Micrososft Corp. MS-DOS and hard-disk management system.

Topdos is said to combine a file and directory manager with keyboard macros and PC-DOS utilities. Features include single-keystroke commands, automatic completion, aliases, context-sensitive Help and real-time operation. Topdos supports a mouse and enhanced graphics adapter displays. Support for up to 1,000M bytes of disk storage is provided.

Topdos costs $69.95.

Frontrunner Development, 14656 Oxnard St., Van Nuys, Calif. 91411.

Steelcase, Inc. has announced **Computer-Aided Design** (CAD) **Templates** for use with Intergraph Corp. hardware and software.

The CAD Templates are said to allow the user to begin with a schematic office plan using either simple shapes or precise office-product graphics. The generic-product graphics of CAD Templates are indirectly linked to specific product-style numbers and descriptions.

CAD Templates operates within Intergraph's core graphic package, Interactive Graphic Design System, as well as with their applications software packages.

CAD Templates costs $450.

Steelcase, 901 44th St. S. E., Grand Rapids, Mich. 49508.

Intex Solutions, Inc. has announced **XYZ:Model** designed to allow Lotus Development Corp.'s 1-2-3 and Symphony users to interface with the overall picture of their spreadsheets.

XYZ:Model is said to translate all cell formulas in existing spreadsheets into a conversational modeling language. The entire model is displayed, edited and used to test different scenarios. Changes can be saved back into 1-2-3 or Symphony spreadsheets.

Three versions are available: The small version costs $145. The Advanced XYZ:Model features the ability to solve simultaneous equations and costs $395. The Custom XYZ:Model Kit, for those who do not use 1-2-3 or Symphony, costs from $995.

Intex Solutions, 568 Washington St., Wellesley, Mass. 02181.

Development tools

National Semiconductor Corp. has announced an **HPC**-family personality board for its Microcontroller On-Line Emulator (Mole).

The HPC family of 16-bit microcontrollers and peripherals is based on the vendor's CMOS technology. It combines 17-MHz operation with a modular design. Mole is said to provide support from initial software development to real-time in-system hardware emulation and read-only memory pattern generation.

The Mole system consists of a Mole personality board, a Mole brain board and software for the user's host computer.

An HPC Mole package, containing the HPC personality board, a user's manual, an emulator cable, a power cable and miscellaneous hardware, costs $2,795.

National Semiconductor, P.O. Box 58090, 2900 Semiconductor Drive, Santa Clara, Calif. 95052.

Software enhancements

Data Access Corp. has announced **Dataflex Version 2.2**, an enhanced version of its multiuser applications development data base system.

Features of Version 2.2 include the Db-read utility for automatically convert-

Continued on page 43

Power has never looked this good.

The WYSEpc 286.

Now you can get higher speed and higher resolution, together in extremely high style.

The WYSEpc 286 goes from "normal" speed to full 10 MHz throttle – *25% faster than a Personal Computer AT* – with the touch of a switch. A new lineup of graphics monitors lets you choose exactly the display capability you need.

Combine the WYSEpc 286 with the WY-530 monochrome or WY-630 color monitor and get outstanding performance. For enhanced color graphics, move up to the WY-640 EGA monitor. Or, bring CAD and desktop publishing applications into better focus, price-Wyse and pixel-Wyse, with the new WY-700 high resolution graphics display as shown at left.

With the new WYSEpc 286, you can also choose the keyboard that's the best fit: either the standard AT-style, or the IBM Enhanced PC keyboard. And you get the complete compatibility you should expect in every other way, including more than 350 tested off-the-shelf software packages.

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Continued from page 41

ing Ashton-Tate's Dbase II, III and III Plus data files, creating equivalent Dataflex data files and writing a Dataflex entry program to handle data base maintenance.

Other new features include windowing, the ability to execute external programs, support for IBM's PC-DOS and Microsoft Corp.'s MS-DOS, Xenix and Unix path name conventions, expanded Dataflex integer variables and enhanced compiling and indexing functions.

Dataflex costs from $995 to $8,000.

Data Access, 8525 S. W. 129th Terr., Miami, Fla. 33156.

Solution Systems has announced **Version 1.2** of its **Dbrief** program development environment for Ashton-Tate's Dbase.

Dbrief is a series of macros designed to run within the programmer's editor Brief. Version 1.2 features a new configuration and installation system that allows the user to customize the performance of Dbrief. Also added to the program are external interfaces for Dbase development utilites. The interfaces include Viewgen, Saywhat, Flashcode, The Documentor, Dflow and Sourceprint.

Other enhancements include extended commands for generating code structures, a syntax window and additional documentation capabilities.

Dbrief costs $95. Bundled with Brief, the price is $275.

Solution Systems, 335 Washington St., Norwell, Mass. 02061.

Brainpower, Inc. has announced **Statview II**, an enhanced version of its Statview 512+ statistics package for the Apple Computer, Inc. Macintosh family.

Statview II operates on the Macintosh II. It provides the ability to address up to 2G bytes of random-access memory and allows full control of color on the screen and supports multiple screen sizes. According to the vendor, graphs of analysis results are scalable to any size and text placement within those graphs can be user-determined.

Statview II contains such statistical analyses as a selection of descriptive statistics, one- to 16-way factorial and repeated measure analysis of variances, 1,600-cell chi-square tables and simple, multiple, polynomial and stepwise regressions.

Statview II costs $450.

Brainpower, Suite 250, 24009 Ventura Blvd., Calabasas, Calif. 91302.

Woodchuck Industries, Inc. has unveiled **Version 1.1** of **P-Tral**, its Basic-to-Pascal translation software.

P-Tral is said to enable the programmer to convert any Apple Computer, Inc. Applesoft Basic program to an Apple Pascal program.

Version 1.1 provides support for Pro DOS and Apple Pascal 1.3; the capability to transfer Pro DOS files, catalog directories and subdirectories and display block maps; the ability to handle nested subroutines up to five levels; warning messages for CALL and POKE statement translations; and automatic configuration for 64K- and 128K-byte systems.

P-Tral Version 1.1 also supports the Apple IIGS.

P-Tral Version 1.1 is priced at $179. Registered P-tral users can upgrade for $35.

Woodchuck Industries, Suite 2B, 340 W. 17th St., New York, N.Y. 10011.

Budget Computer, Inc. has announced **Release V3.0** of its **Mi-Amor** amortization program.

V3.0 is said to support variable-rate loans and allow an unlimited number of rate changes. It also features a front-end fee capability.

Mi-Amor is said to compute principal, payment, rate or term with accuracy to 11 digits. Weekly, biweekly, semi-monthly and annual payments are supported. Amortizations allow Rule of 78s, up to four heading lines, balloons, negatives, check-number and date-paid columns, left margin offset, line spacing and paging in addition to other features.

Mi-Amor costs $89.95.

Budget Computer, 160 S. 2nd St., Milwaukee, Wis. 53204.

Information Dimensions, Inc. has enhanced its **Microbasis** retrieval software for compact disk/read-only memory publishing.

The software is said to feature a window-oriented user interface with pop-up menus and context-sensitive Help. It offers a clipboard function that allows users to extract and tag retrieved data with time and source labels and annotate extracted information to be written to Microsoft Corp. MS-DOS files.

Microbasis runs on IBM Personal Computer XTs, ATs and compatibles as well as on Digital Equipment Corp.'s Microvax and Vaxmate. License costs start at $25 per disk.

Information Dimensions, 655 Metro Place South, Dublin, Ohio 43017.

ATR, Inc. has announced **Planning Tools Version 1.5**, an enhanced release of its planning software for IBM Personal Computers and compatibles.

Planning Tools Version 1.5 is offered as three modules designed to aid with each phase of a decision-making process.

The Evaluate module is said to allow users to identify and rank possible alternatives to a decision.

The Select module is said to allow users to determine which projects or tasks to undertake, and the Assign module allows users to allocate available resources to selected projects.

Planning Tools is priced at $95 for any one module or $195 for all three.

ATR, Suite 110, 900 Artesia Blvd., Redondo Beach, Calif. 90278.

Data storage

Jasmine Technologies, Inc. has announced a **40M-byte hard disk drive** for Apple Computer, Inc.'s Macintosh computers and has reduced the price of its 20M-byte drive.

Jasmine now offers 20M-, 40M- and 80M-byte external hard disk drives for the Macintosh Plus.

The 40M-byte drive costs $999. The 20M-byte hard disk drive is now priced at $579.

The vendor has also announced that Laserspeed software, a Laserwriter print spooler from Think Technologies, Inc., is being bundled with the drives at no cost. Laserspeed was designed for use on Appletalk networks with a Laserwriter printer.

Jasmine Technologies, 555 DeHaro St., San Francisco, Calif. 94107.

Curtis, Inc. has announced **ROMDisk PCE**, an enhanced version of its read-only memory disk personal computer subsystem.

ROMDisk PCE is said to provide the same programming and autoboot operating modes as the original ROMDisk PC with the additional capabilities of emulating a diskette to provide 1.2M bytes of data storage. Up to four ROMDisk PCEs can be used in a single computer to provide up to 4.8M bytes of data storage.

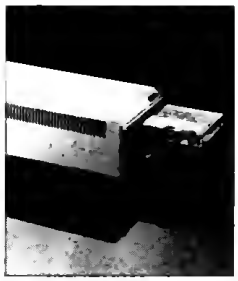
ROMDisk PCE comes in an erasable programmable read-only memory (EPROM) version using 1M-byte EPROMs and in a cassette model using either EPROM cassettes or static random-access memory cassettes with up to 786K bytes of data storage.

ROMDisk PCE is priced from $495.

Curtis, 10 Anemone Circle, St. Paul, Minn. 55110.

Scientific Micro Systems, Inc. has announced **Identica**, a ¼-in. cartridge tape subsystem for IBM Personal Computer XTs, ATs and compatible systems.

The Identica 60M-byte system combines a half-height cartridge tape drive with a controller and applications software. It supports the IBM PC-DOS operating system and Unix and Microsoft Corp. Xenix partitions.



***Identica**, a 60M-byte system.*

The subsystem stores up to 60M bytes of formatted data at up to 5M byte/min. It provides complete media interchangeability with industry-standard tape cartridges.

The external configuration of Identica costs $1,395. The internal version costs $1,195.

Scientific Micro Systems, 339 N. Bernardo Ave., Mountain View, Calif. 94043.

Alloy Computer Products, Inc. has announced the **APT-40/Q**, a quarter-inch compatibility (QIC)-40-compatible version of its APT-40 series tape drives.

The APT-40/Q is said to be compatible with the QIC-40 Rev. D tape standard. The 40M-byte cartridge tape drive is said to transfer data at 500K bit/sec. It is available in both 3½- and 5¼-in. form factors and was designed to plug directly into the IBM Personal Computer AT's floppy-disk controller and power connector.

The APT-40/Q costs $345.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

Scientific Micro Systems, Inc. has announced the **OMTI 7200**, **OMTI 7300** and **OMTI 7400** small computer systems interface controllers.

The OMTI 7200 supports up to two Winchester hard disk drives in either the enhanced small device interface or ST506/412 interfaces and up to

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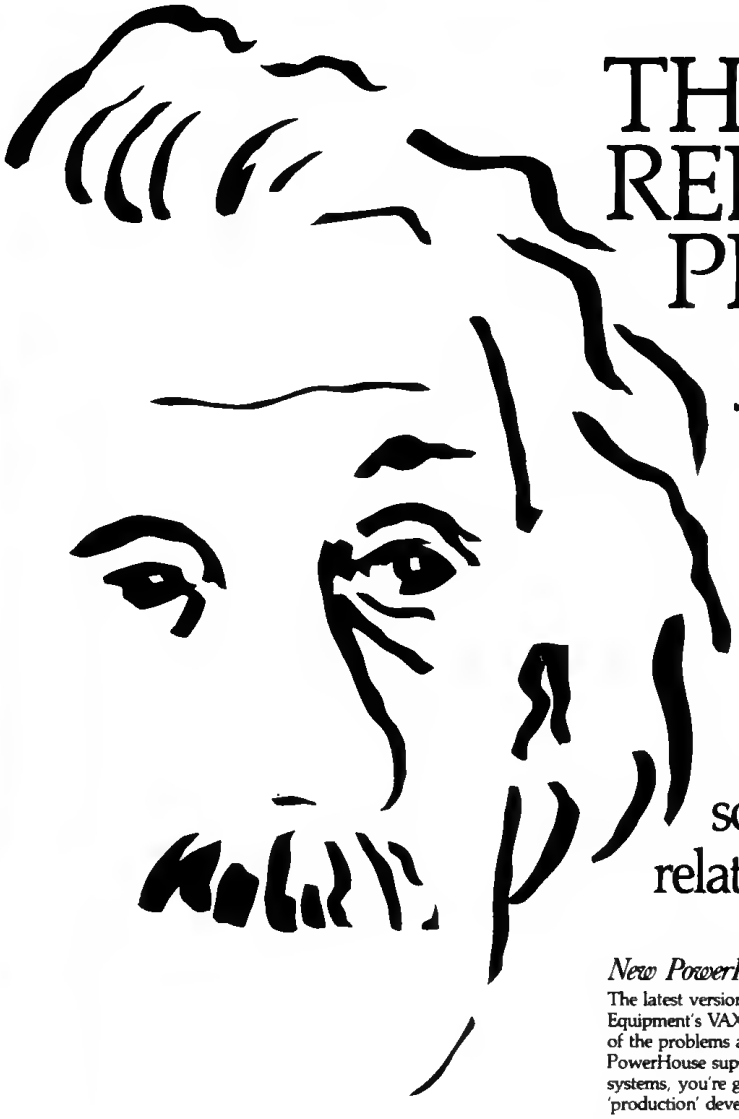

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COGNOS

Continued from page 44

four 3½-, 5¼- or 8-in floppy drives. The OMTI 7300 supports one QIC-02 streaming-tape drive and up to two Winchester drives. The OMTI 7400 supports one QIC-02 streaming-tape drive and up to two Winchester drives.

Features include disconnect/reconnect functions, arbitration support and multithreading operations.

Prices are $220 for the OMTI 7200 and 7300 and $330 for the OMTI 7400.

Scientific Micro Systems, 339 N. Bernardo Ave., Mountain View, Calif. 94043.

Printers/Plotters/Peripherals

Fujitsu America, Inc. has released a monochrome version of its **DL2600** dot matrix printer.

The DL2600 provides letter-quality printing at 96 char./sec., report quality at 190 char./sec. and draft quality at 288 char./sec.

Graphics resolution is 360 by 180 dot/in., according to the vendor.

Features include a 16-char. LCD front-panel display that provides programming of print functions and notifies the user of print status, Fujitsu said.

The printer also includes a built-in bi-directional tractor feed and automatic sheet load.

The DL2600 dot matrix printer is priced at $1,495.

Fujitsu America, 3055 Orchard Drive, San Jose, Calif. 95134.

Imagen Corp. has announced the **3308 Imageserver XP**, a laser printer system.

The 3308 consists of a laser printer marking engine, performanced optimized raster image processor, host/network interface and system software. It was designed for use in a work group environment of two to four users.

Features include 8 page/min. throughput; dual-input paper trays each holding 250 pages, 200-page output tray, face-up or face-down selectable output and an offset output document stacker.

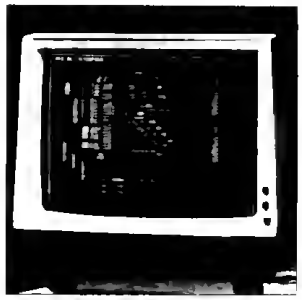
The 3308 Imageserver XP is priced at $10,950.

Imagen, P.O. Box 58101, 2650 San Tomas Expwy., Santa Clara, Calif., 95052.

Conrac Corp.'s Display Products Group has announced the **7250 series** 19-in. color monitor.

The monitor offers the Auto Trak feature said to allow full compatibility with most personal computer graphics standards.

According to the vendor, the multiscanning monitor provides compatibility



Conrac's *7250 series color monitor*

with IBM's Monochrome Display Adapter, Color Graphics Adapter, Enhanced Graphics Adapter and Professional Graphics Adapter. Compatibility is in high-resolution as well as emulation modes.

The 7250 features a high-contrast, antiglare 0.31mm dot-pitch precision in-line CRT. Resolution is up to 1,024 by 1,024 pixels.

The 7250 series monitor is priced at $2,995.

Conrac Display Products Group, 600 N. Rimsdale Ave., Covina, Calif. 91722.

Board-level devices

Sigma Designs, Inc. has reduced the prices for its **Color 400**, **Sigma EGA** and **EGA 480** graphics boards.

The Color 400 is a short-slot card offering 640- by 400-pixel resolution in noninterlaced mode.

The Sigma EGA, also a short-slot card is said to be compatible with the IBM Enhanced Graphics Adapter (EGA), Color Graphics Adapter, Monochrome Display Adapter and the Hercules Computer Technology, Inc. graphics mode.

The Sigma EGA incorporates 256K bytes of random-access memory onboard. The EGA 480 provides resolutions of 640 by 480 and 752 by 420 pixels.

The Color 400 costs $499, the Sigma EGA costs $399 and the EGA 480 costs $499.

Sigma Designs, 46501 Landing Pkwy., Fremont, Calif. 94538.

Qualogy, Inc. has announced the **QPC-5201**, a CMOS I/O expansion board for IBM Personal Computers and compatibles.

The QPC-5201 contains two serial and two parallel ports. Up to four boards can be used in a single system because they share a common interrupt channel.

The parallel ports can be individually configured as Centronics Data Computer Corp.-compatible printer ports or as general-purpose 8-bit parallel I/O ports.

The serial ports support asychronous communications and each can be individually configured as RS-232 or RS-422 ports.

The QPC-5201 I/O expansion board costs $295.

Qualogy, 2241 Lundy Ave., San Jose, Calif. 95131.

NETWORKING

DATA STREAM

Patricia Keefe

IBM discards network shell

IBM is in a communicative mood, or should I say mode, these days. Any number of things could have triggered the ordinarily Chaplinesque (meaning quiet) giant's outpouring of strategic missiles, guidance and information regarding its grand connectivity scheme in the first quarter.

It's interesting to note that no sooner did IBM dub this "the year of the customer" than it cranked up its arsenal of communications layers, protocols and acronyms and began firing away. The first shot came in February with the announcement of Systems Applications Architecture, IBM's global linkage plan.

The second round of artillery came last month with the announcement of the Operating System/2 and a bevy of communications and network management hardware and software. A third barrage is expected sometime this month: IBM has indicated it will be releasing products every 30 days or so. A significant portion of that blitz should be the mid-

Continued on page 48

Business returns go high-tech

BY VICTOR S. WHEATMAN
SPECIAL TO CW

MOUNTAIN VIEW, Calif. — Last year, the Internal Revenue Service started testing an electronic filing system for personal income tax returns to reduce paperwork. IRS officials said certain business returns were added to the test this year. Since the filings are machine readable and go through a network, they fit the definition of electronic data interchange (EDI), at least for business users.

EDI is the computer-to-computer transfer of machine-readable information representing business documents such as purchase orders and invoices.

The personal returns test program is called the Study of the Utility of Processing Electronic Returns (Super). Processing is handled by the IRS's Cincinnati service center. Super-B, for business returns, is run through the Andover, Mass., service center.

Some 58 tax preparation firms are participating in the personal income tax test. The firms send electronic returns through another six companies that are acting as communications agents, receiving returns from the other 52 and sending them to the IRS. The six are Speed-S Corp. in Minneapolis; Fasttax in Carrollton, Texas; Beneficial Management Corp in Peapack, N.J.; Chartain Corp. in Belmont, Calif.; Reliable Tax & Bookkeeping in Dayton, Ohio; and H & R Block in Kansas City, Mo.

Continued on page 51

Fiber-optic LAN market expected to soar

BY ELISABETH HORWITT
CW STAFF

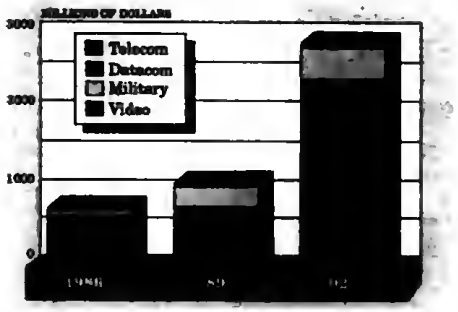
Local-area networks (LAN) make up the fastest growing segment of the U.S. fiber-optics market, which will increase an average of 25% per year to $2.9 billion in 1992, according to a recently published report by Kessler Marketing Intelligence (KMI).

The Newport, R.I., research firm predicts that the overall fiber-optics market will decline from $774 million in 1986 to approximately $666 million this year. It says the market will return to 1986 levels in 1988 before jumping to $1.08 billion in 1989. KMI attributes the short-term slump to a decline in new installations of long-haul fiber-optic links from 1986 to 1992.

During the past two years, major interexchange carriers AT&T, MCI Communications Corp. and U.S. Sprint Communications Co. have installed thousands of miles of optical fiber cable in a race to link their central office sites on a coast-to-coast network. Each carrier's backbone facilities are now in place

Continued on page 49

U.S. fiber-optics market, 1980 to 1992
Data communications on the rise



INFORMATION PROVIDED BY KESSLER MARKETING INTELLIGENCE
CW CHART

Ethernet price war escalates

BY PATRICIA KEEFE
CW STAFF

Ethernet prices, at least on the low end, are dropping at a rapid pace, in part because two local-area network vendors appear to be swapping price cuts on their Ethernet hardware.

In February, Novell, Inc. in Orem, Utah, announced plans to ship an Ethernet adapter card for $495. Two weeks ago, 3Com Corp. in Santa Clara, Calif., slashed $100 off the price of its Etherlink card, which now sells for $495, tossing the ball into Novell's court. Last week, Novell volleyed, announcing it had repriced its Netware Ethernet NE-1000 adapter to $395, or $100 less than 3Com's board.

But both vendors deny that a price war exists, instead attributing price reductions to advances in technology.

Novell initially announced plans to market its own Ethernet

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Inside

IBM discards

FROM PAGE 47

range to high-end Token-Ring connections unveiled by IBM in October 1985 and slated for delivery in the third quarter.

IBM's priorities are selling iron and keeping MIS in line. For almost two decades, IBM sold a lot of iron while MIS barred the door to most would-be competitors. IBM then released a nothing product called the Personal Computer, and everything changed.

But it was the advent of the next revolution in computing — communications — that probably brought home to IBM the extent of that change.

Take a look at what the PC has dragged in — an unruly rabble of micro devotees who owe allegiance to no one. Independent users are blasphemy to the IBM sales force. The same users who happily supported the PC-compatible industry were also responsible for seeding work groups and departments with third-party local-area networks (LAN), modems and electronic mail — mostly behind MIS's back.

It's probably fair to say that this lot forced IBM into action. And respond it did, although with four different LANs. Instead of greeting this barrage with patience and understanding, users came back loud and clear: too confusing, too slow and too expensive.

Again IBM has respooded — this time with some enhancements to current product offerings, yet a fifth PC LAN and a lot of promises.

Once again, the group most vocal with its complaints is the PC users. They need mainframe access and network management. They want reassurance that their investments in Netbios will be protected. But this time, they will be joined by MIS executives who not only want to exert some cootrol over mushrooming LANs but also want multivendor connnectivity.

Since IBM moves in mysterious — and slow — ways, it behooves both MIS and the micro crowd to keep the pressure on. But not just on IBM. As IBM has so painfully learned, the world is a multivendor, multistandard shop. This means the responsibility for linking up the disparate systems in those shops is a shared one.

IBM has taken an important first step toward placating users by revealing the framework for an extremely ambitious plan, particularly given its regrettably late start in the communications derby. But the second step is anywhere from six months to two years off. Big companies just don't turn on a dime.

What can you do for me?

So while IBM has given us a *feel* for what it likes to call "connectivities," it's of little consolation to those installations in serious need of products they can *touch* today. As one frustrated user recently asked an IBM networking representative, "What can you do for me today?"

As difficult as it may be to accept, the answer is not much. Like it or not, users are going to have to wait. Unless, of course, independent network vendors move quickly to fill parts of the communications void that IBM either has no intention of filling or has papered over with promises. For example, IBM appears not to be inclined to provide a Netbios-to-Advanced Program-to-Program Communications bridge.

Third parties who rise to these challenges not only provide proper support for their installed base, but also find this one- to two-year window of opportunity to be their best, and in some cases only, shot at grabbing a respectable share of the Fortune 1,000.

There are simply too many half-finished or pending standards, promises of products and claims of compatibility with nonexistent solutions. Users these days seem to be saying, "Put up or shut up." Vendors that can provide actual products that really work will find themselves welcomed with open arms by companies that no longer care how many letters are in their name.

Keefe is a *Computerworld* senior editor, networking

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The LXN system integrates easily into the Tandem transaction processing network. You can access both Tandem host applications and UNIX applications, as well as other hosts through SNA or X.25. You can connect PCs to LXN through Ethernet LANs, then LXN to other systems. A MS-DOS file server provides availability benefits of LXN to PC users.

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Tandem is the first to bring OLTP features to UNIX systems in this price range. The system can support two mirrored disks. If one fails, the other takes over. In case of power failure, an uninterruptable power supply will run the entire system for up to five minutes. It will also send everything in memory to disk. When power is restored, auto restart resumes where you left off, maintaining data integrity.

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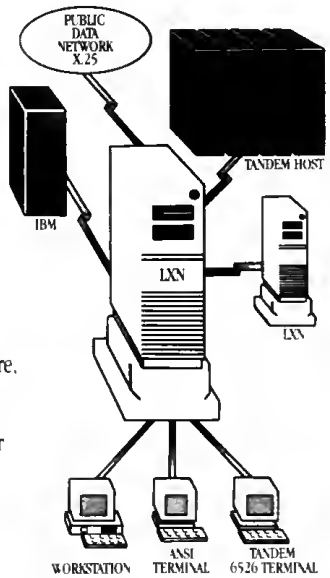
Now you can run your off-the-shelf UNIX applications and access the Tandem OLTP network—all from one workstation. The power comes from a 32-bit microprocessor. It's backed by a 1.6 megabyte floppy disk drive, an 80 or 170-megabyte hard-disk storage, and a 60-megabyte streaming cartridge tape drive.



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BIT BLAST

Rabbit, NEC join to offer turnkey solutions

Rabbit Software Corp. has entered a worldwide agreement with **NEC Corp.** in which Rabbit will adapt 3270-Plus and RJE-Plus, two of its IBM Systems Network Architecture-based micro-to-mainframe software products, to run with NEC's office automation systems. The resulting turnkey solutions are set to be available through Rabbit and NEC Information Systems in the U.S.

Adacom Corp. has released a very large-scale integration 32-channel multiplexer for the IBM 3174 controller that allows users to connect up to 32 terminals off a single line. The CM 2132, which previously served IBM's 3274 controller, has been beta-tested at Northwest Airlines, Adacom said. The product costs about $100 per port.

Proteon, Inc. has signed a $2.5 million OEM agreement with **Novell, Inc.** that will allow Proteon to distribute and support Novell's Advanced Netware/86 and 286 network operating systems. The contract includes Novell's System Fault Tolerance Netware Levels I and II and the Transaction Tracking System software. These products run on Proteon's 10M bit/sec. Pronet-10 and 4M bit/sec. Pronet-4. In the first quarter, Novell discontinued distribution of Proteon networks through its distribution channels.

Network Research Corp. has raised $1.8 million to expand development capabilities for its Fusion Network Software and to provide an additional leased line for the acquisition of capital equipment for research and development. The financing came from existing investors — Hambrecht & Quist, Inc., Hillman Co. and Atlantic Venture Partners — and from Network Research's first-round investors, including Gaymark Associates.

Fibercom, Inc. has signed a $3.5 million contract with **Computer Connection A/S** in Moendalen, Norway. Fibercom's Whispernet, an Ethernet implemented in fiber optics, reportedly will be used in a nationwide fiber-optic data communications network linking 850 bank branches. Whispernet will interconnect self-service automated teller machines, electronic funds transfer systems and point-of-sale terminals based on NCR Corp.'s workstations and Tower multiuser computer line.

Chipcom in Waltham, Mass., has shrunk the bandwidth taken up by its broadband Ethernet connection, Ethermodem, so that two Ethermodem-based networks can coexist on the same broadband cable with a Manufacturing Automation Protocol network.

The older version overlapped with MAP's bandwidth after only one Ethernet channel was installed. Chipcom said the new product is for companies that are "reserving the MAP channel for future installations."

The new Ethermodem III/12 uses a 12-MHz broadband channel and supports 10M bit/sec. data rates. It is priced at $5,250 for the two-port model and $6,350 for eight ports and is scheduled to be available in the third quarter.

Fiber-optic LAN

CONTINUED FROM PAGE 47

and bringing in demand, although AT&T still plans to install another 23,000 miles of fiber-optic cable, according to KMI President John N. Kessler.

In addition, a number of independent companies are reselling fiber-optic facilities, creating a glut on the market, he adds. And new technology that has become available this year has raised the total capacity of fiber-optic transmission equipment from 565M bit/sec. to 1.7G bit/sec., Kessler notes.

This high-speed, high-cost fiber-optic equipment has enabled customers to meet their needs with less cable. At the same time, the higher capacity systems do not address the needs of the short-haul local-loop market, Kessler says. "The subscriber loop carries less traffic so that you can't justify expensive components. So the market will begin to grow when we see lower cost, lower capacity components." Carrier demand for fiber-optic cable on distribution and subscriber drop links should begin climbing around 1990, according to KMI. Sales will rise from $9 million in 1986 to $75 million in 1989 and to $1.4 billion in 1992, the research firm predicts.

The increase in the fiber-optic data communications market is primarily composed of dedicated local-loop facilities that bypass local telephone companies, backbone networks that connect multiple buildings within campus areas and fiber-optic LANs, KMI says. The fiber-optic LAN market will soar from $13 million in 1986 to $314 million in 1992, according to the research firm. A major factor in this increase is industry implementation of the Fiberoptic Distributed Data Interface — standard specifications for allocating bandwidth on a fiber-optic LAN and interfacing computer systems to the medium.

"Any step toward standards is important in the data communications sector," Kessler says.

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Price war

CONTINUED FROM PAGE 47

adapter for $495 after 3Com decided not to renew a contract allowing Novell to purchase 3Com's Ethernet products. Novell had been reselling 3Com cards through its distributors and Netware centers, but that pact expired in February.

Novell's latest maneuvering "effectively lowers the price for each networking workstation and should make networking in general more attractive to potential users," said Craig Burton, Novell's vice-president of corporate marketing and development.

Novell said it was able to lower the price on the NE-1000 because the adapter uses the new chip set developed by National Advanced Systems Corp. The board uses fewer, less expensive components and fits into a half-size slot on the IBM Personal Computer or compatible. It connects to both thick and thin Ethernet cabling and will coexist with Ethernet boards from 3Com and Micom-Interlan, Inc. 3Com's price reductions were announced along with two new network adapter cards compatible with IBM's Personal System/2 Model 30, IBM PCs and compatibles — Token Link, an entry-level follow-on product to Token Link Plus set to be available this month, and Etherlink II, the successor to 3Com's IEEE 802.3-compatible Etherlink, which should be available in June. Token Link costs $650; Etherlink II costs $495.

3Com also cut the cost of its intelligent token-ring card, Token Link Plus, from $1,095 to $895. The Token Link Plus Software Starter kit, which includes all the software and hardware needed to install a three-user token-ring system, has been reduced to $3,495 from $4,650.

Eases net testing

The new adapter cards feature software-selectable direct-memory access and interrupt channels, allowing a network manager to configure the adapters from the keyboard, easing the process of testing and maintaining a network.

Joining the parade of Ethernet announcements was Excelan, Inc. in San Jose, Calif. Excelan unveiled the EXOS 205T intelligent PC controller board, which it said brings increased flexibility and lower cost to departmental and work group networks.

The EXOS 205T allows IBM PC XTs, ATs, RTs and compatibles to communicate with other micros and with dissimilar host computers in mixed Ethernet environments, such as over standard thick or lower cost thin Ethernet cable.

The 205T board features 265K bytes of random-access memory with zero-wait states, allowing the board to off-load communications processing from the personal computer, increasing the PC's overall performance and giving it more memory in which to run applications.

The EXOS 205T, available now, costs $895. Packages run from $895 to $1,295; discount schedules are available.

Business returns

CONTINUED FROM PAGE 47

Five of the six agents transfer data to the IRS via a front-end communications processor from Mitron Systems Corp. in Columbia, Md. The sixth participant, H & R Block, has commercialized the service as Rapid Refund and offers it to taxpayers regardless of who does the return.

Communications are handled through the Sears Financial Network using IBM 2780/3780 bisynchronous protocols that are linked to an H & R Block-owned IBM Series/1 housed at the IRS. Many H & R Block offices are located in Sears, Roebuck and Co.'s retail financial centers.

So far, only taxpayers with fairly simple filings can use the method. Approximately 26,000 personal returns were filed electronically in 1986, with substantially lower error rates than traditionally filed paper returns.

The IRS says it can handle 150,000 personal filings through the electronic service. According to Joan France, an IRS public affairs officer, 77,611 returns were electronically filed with the IRS this year.

Last year's test was limited to three markets: Phoenix, Cincinnati and the Raleigh, Durham and Fayetteville, N.C., area. In these areas, taxpayers can have their tax refund checks directly deposited into a designated bank account.

The IRS says it hopes this will enhance the benefit and popularity of electronic filing.

Agents charge approximately $25 to $30 to electronically transmit a personal tax return to the IRS if the return is prepared by the filer or someone else. If the agent does the return, the incremental cost is lower.

Eighteen tax services, banks and accounting firms are now handling business returns as agents for corporations. Business filers can choose the option of shipping magnetic tape to the Andover processing center through their agents or use electronic transmission into the IRS's Mitron network. The method chosen depends on the number of attached forms and schedules. Some companies file up to 500,000 attachments, and it is not cost-effective to electronically transmit this volume.

The IRS projects that eventually, both businesses and individuals will be able to electronically file, improving efficiency, reducing errors and speeding refunds.

Wheatman is manager of the EDI Planning Service at Input, a Mountain View, Calif.-based computer and communications consulting and research firm.

NEW PRODUCTS

Local-area network hardware

Western Digital Corp. has announced **Starcard Plus**, a personal computer adapter board for use with its Starlan local-area network.

The board is said to plug into an IBM Personal Computer, PC XT, AT and compatibles to provide a network station interface to the 1M bit/sec. Starlan network in conformance with the IEEE 802.3 standard. It connects the computer to the Starlan network at any Starlan-compatible hub. It can operate with the vendor's Starcard and Starlink products.

Starcard Plus is priced at $299.

Western Digital, 2445 McCabe Way, Irvine, Calif. 22714

Network management

Paradyne Corp. has introduced the **Analysis 6510** automated network management and control system.

Analysis 6510 is said to offer network diagnostics and control, reporting functions and network administration. The fully configured system supports up to three operator consoles, two system printers, 150 diagnostic ports and up to 2,000 devices. It continuously monitors network conditions, allowing the operator to analyze input in real time.

Analysis 6510 is priced from $21,250, including a controller, console and printer.

Paradyne, 8550 Ulmerton Road, Largo, Fla. 33541.

Customer-premise equipment

Rolm Corp. has announced enhancements for its **Redwood** digital telephone system.

The enhancements include Redwood Networking, which reportedly allows a Redwood system to function as the main control point or as an end point in a voice network. Transparent Network Dialing, which is said to enable a Redwood system to route calls to any other system in a network; Direct Inward Dialing, which is said to allow an external caller to ring a Redwood station without going through an attendant; Direct Inward System Access, which reportedly allows off-site callers to access Redwood system features; and Remote Systems Management, which is said to allow Redwood to participate in centralized network management.

Redwood is priced from $400 to $700 per line for equipment only.

Rolm, 4900 Old Ironside Drive, Santa Clara, Calif. 95054.

Links

Develcon, Inc. has announced the **Model 7182/TCP** integral IEEE 802.3 gateway card for its networking data private branch exchange, **Develnet**.

The card is said to permit users of asynchronous Develnet to access 802.3 local-area networks (LAN) operating under Transmission Control Protocol/Internet Protocol (TCP/IP). The single card can be installed in any Develnet node to provide a direct gateway to an 802.3 LAN for up to 64 virtual circuits. It supports multiple sessions per user.

The TCP/IP standard is said to be completely defined throughout all protocol layers. Full control and configuring of the Model 7182/TCP is possible from the Develnet operator interface.

The Model 7182/TCP is priced at $5,000.

Develcon, Suite E, 6701 Sierra Court, Dublin, Calif. 94568.

Avatar Technologies, Inc. has unveiled the **PA100G** micro-to-mainframe link said to be compatible with IBM's 3278/3279 emulation adapter.

The PA100G is a half-size plug-in personal computer expansion card based on Avatar's 3270 custom gate-array chip. It provides IBM 3278 and 3279 emulation for IBM-compatible personal computers. The card works in conjunction with either IBM's host-based 3270-PC File Transfer program or Avatar's Host File Transfer software. It runs with IBM's entry-level 3270-PC Emulation Program.

The PA100G costs $479.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

Protocol converters

Local Data, Inc. has introduced an enhanced version of its **Datalynx/3274** protocol converter featuring the Termlynx-II software package.

The enhanced Datalynx/3274 offers local editing capabilities that allow users running at 300 or 1,200 bit/sec. to edit text on the CRT screen before sending it via dial-up lines to the IBM mainframe.

The Datalynx/3274 reportedly acts as an IBM controller providing dial-up communications to an IBM host computer from ASCII devices.

Enhanced models are priced from $2,300. Standard Datalynx/3274 boxes can be upgraded for $1,500. The Termlynx-II is priced at $100.

Local Data, 2771 Toledo St., Torrance, Calif. 90503

Dynatech Packet Technologies, Inc. has added the **Model 224** to its Multipad X.25 family of packet assembler/disassemblers that convert asynchronous communications from data terminal equipment to conform to synchronous X.25 protocols.

The Model 224 is said to concentrate up to 24 terminals onto dual X.25 trunks and provide access to public packet-switched data networks and can serve as a host port concentrator for a host without its own X.25 support.

The Multipad X.25 Model 224 is priced at $11,950.

Dynatech Packet Technologies, 6464 General Green Way, Alexandria, Va. 22312.

File servers

Linkware Corp. has announced a version of its **Linkware Information Server** said to support IBM's VTAM on MVS and MVS/XA systems.

The Information Server is a host-based file-management and communications product that gives personal computer users the ability to access mainframe files directly through VTAM. It controls file sharing and manages individual files for PC end users connected to the MVS system, according to the vendor.

Communications services include file-transfer facilities, terminal emulations and data transfer commands.

The Linkware Information Server for MVS/VTAM is priced from $11,075 to $35,000.

Linkware, 128 Technology Center, Waltham, Mass. 02154.

Modems/ multiplexers

Micom Systems, Inc. has announced the **MB-D56-1**, a 56K bit/sec. integrated service unit board for use with members of the Micom Box family of modular multiplexer products.

The board is said to enable users to transmit composite data at 56K bit/sec. over a 56K bit/sec. data phone digital service line. When used with the Micom Box Type 3 Concentrator, the MB-D56-1 integrated service unit is software-configured. It is hardware-configured for use with both the Micom Box Type 4 and Micom Box Type T Time Division Multiplexers. It also supports a diagnostics program, including local and remote testing and test-pattern generation.

The MB-D56-1 is priced at $1,250.

Micom Systems, P.O. Box 8100, 4100 Los Angeles Ave., Simi Valley, Calif. 93062.

Universal Data Systems, a division of Motorola, Inc., has announced the **Model 9600AS** data modem and the **Universal Data Shelf**.

The modem is CCITT V.29-compatible in the 9.6K bit/sec. mode and AT&T 208A/B-compatible in the 4.8K bit/sec. mode. It provides full-duplex synchronous or asynchronous operation at 9.6K, 7.2K or 4.8K bit/sec. over four-wire private lines.

The data shelf model offers a method of data communications device storage. Available in both AC- and DC-powered models, it encloses up to 26 long-haul modems, short-haul modems, data service units and customer service units and multiplexers in one shelf. Eleven models with interchangeable backplane configurations such as wire wrap and mass terminal connections are available.

The shelves cost from $525. The modem costs $1,650.

Universal Data Systems, 5000 Bradford Drive, Huntsville, Ala. 35805.

Philips Information Systems, Inc. has announced the **Sematrans** series of very large-scale integration modems.

The series consists of the Sematrans 9696 V.32, featuring digital echo cancellation, three digital signal processors and full-duplex operation at 9.6K bit/sec. over standard dial-up lines, and the Sematrans 9631 V.29, which offers 9.6K bit/sec. synchronous transmission rates.

The series also includes the Sematrans 4821 V.27, said to feature 4.8K and 2.4K bit/sec. transmission rates, dial-up operation over the switched telephone network or point to point, and the Sematrans 1042 Short Haul modem.

Each model is said to allow for compatibility with the others in the series.

The modems are priced to $2,995.

Philips Information Systems, Suite 512, 2570 El Camino W., Mountain View, Calif. 94040

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SYSTEMS & PERIPHERALS

HARD TALK

Stanley Gibson

New CSA a KO tactic?

IBM's recent overhaul of the Corporate Service Amendment (CSA) to its Maintenance Agreement has taken a program that began life quietly and awkwardly and rebuilt it into a strategic weapon of major importance

The new maintenance discount program, which sharply reduces the threat of withdrawal penalties and offers free 24-hour, seven-day-per-week service, puts the ball squarely in the court of third-party maintenance companies, which must respond with an aggressive plan of their own or face a life-threatening loss of business to IBM.

All this is great for service customers — but only if they play their cards right.

If users flock like sheep to IBM's new CSA without waiting a decent interval for competitors to respond, they will almost certainly be assisting in the elimination of some competitors from the market. And competition is the very force that led to the discounts being offered in

Continued on page 56

Tower 800 falls in benchmarks

BY JAMES CONNOLLY
CW STAFF

CHICAGO — The high-end model of the NCR Corp. Tower family, announced in February, falls short of the performance of its smaller predecessor in several key areas, including business-oriented tasks, according to benchmarks performed by a testing company.

While NCR officials conceded that the NCR Tower 32/800 failed to score well on some of the Neal Nelson & Associates tests, they countered that the results do not reflect the benefits of the 32/800's multiprocessor architecture. NCR also noted that the benchmarks were run on a prototype of the 32/800 in December and said the company will ask Neal Nelson to run the tests again on a more efficient production model of the 32/800.

Neal Nelson, president of the Chicago-based testing firm, said he released the information about the tests on the 32/800 and Tower 32/600 as the first in a series of reports on various vendors' computers. "We are not singling out NCR. We intend to alert people on a continuing basis to what we find in our research," he added

"Serious problems were uncovered in several areas of disk I/O. This was both a surprise and a disappointment to us. The Tower 32/600 is a very good machine, and we had expected the 32/800 to be even better," Nelson said.

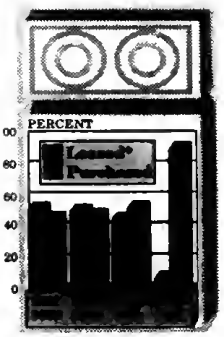
Nelson ran the Business Benchmark suite via a telephone link to NCR systems. He said that in eight categories, primarily calculation tests, the 32/800

Continued on page 56

Data View

Leaning to IBM leases

Fortune 1,000 companies tend to lease IBM mainframes but buy Digital Equipment Corp. gear



*Includes IBM credit, third-party leasing companies and extended rent from the vender

INFORMATION PROVIDED BY COMPUTER INTELLIGENCE
CW CHART SUSAN ALDAM

Ibis claims giant leap with 2.8G-byte drive

BY JAMES CONNOLLY
CW STAFF

WESTLAKE VILLAGE, Calif. — Ibis Systems, Inc. last week extended its line of disk drives for supercomputers with the introduction of its 2.8G-byte Model 2812 disk system.

The company claimed that the 2812, which uses parallel-transfer technology, transfers data at 12M byte/sec., which is up to 20 times the speed of conventional serial-channel drives

The drive is said to provide twice the capacity of Ibis's earlier Ibis 1400 in a package that is 40% smaller.

The vendor said the product was designed to meet the high-speed I/O needs of supercomputers, minisupercomputers and array processors in markets such as scientific processing, signal processing and image processing, in which large blocks of data must be transferred at high speeds.

The 2812 incorporates 6M byte/sec. recording-channel technology using Ibis's proprietary thin-film media in combination with thin-film heads. Its linear recording density is 32,000 bit/in.

It is available with an Ibis-1 or an Ibis-2 interface. Both offer a 16-bit parallel data bus and dual-port capabilities.

The Model 2812 costs $77,200 in OEM quantities and will be available during the fourth quarter, Ibis said.

Electronic forms seen thriving

BY NINAMARY BUBA MAGINNIS
CW STAFF

WALTHAM, Mass. — The electronic forms industry will boom — with up to 900% growth projected during the next five years — undercutting the traditional forms industry, according to Datek Information Services, a research and publishing firm

The traditional forms industry, estimated at $5.9 billion in 1985, will experience modest growth during the same time frame, predicts Naomi Luft, a Datek senior research analyst Datek does not have an estimate for expected damage to the traditional forms industry, Luft says

The most wide-reaching electronic forms vendor is Carrollton, Texas-based Computer Language Research, Inc. (CLR) CLR's Electronic Form Systems Division recently signed several reseller agreements with major companies, including the Glenview, Ill.-based Moore Business Forms, Inc., a large player in the

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Inside

Tower 800

CONTINUED FROM PAGE 55

with two application processors and one file processor — an entry-level 32/800 configuration — was about twice as fast as the 32/600 with one CPU. In sequential reads and writes of long records, the 32/800 was more than twice as fast as the smaller system.

But Nelson said the 32/800 ran at one-fifth to one-half the speed of the 32/600 on six other tests, including what he called "normal task" and "disk-intensive task."

He said the 32/800's performance slipped further behind the 32/600 as those tasks were run with more simulated users.

Nelson said the tested 32/800 has a price tag of $109,000, more than three times that of the older 32/600.

He added that the 32/800's results on the disk-intensive and normal tasks were surprising because those tests were designed to measure performance in commercial data processing environments — the area for which NCR has targeted the 32/800 — rather than high-performance scientific and engineering applications, which are more CPU-intensive.

Plans to retest 32/800

Robert Van Steenberg, director of product excellence for NCR, said the computer maker plans to ask Nelson to retest the 32/800 and that the tuning changes were made in the system after the Nelson test and other benchmarks were run.

Van Steenberg said the other benchmarks, including Aim Technology, Inc.'s AIM3 and the NCR-developed public domain System Characterization Benchmark, provide better measures of the 32/800's multiple-processor architecture than did Nelson's test. Van Steenberg said Nelson's test is basically a single-threaded test that is better at measuring uniprocessors than multiple processors.

'Improves as users get at it'

"Our experience is that the 800 continues to improve as more users get at it. But as more users do get at it, you add incremental processing power," Van Steenberg said.

The 32/800 was designed to support multiple application and file processors and several special-purpose processors that off-load jobs from the application and file processors.

Van Steenberg said the rule of thumb for the 32/800 is that 16 to 20 users can be supported on an application processor and file processor combination with an 80% performance gain for each combination added. However, some customers have supported 88 users with such combinations, he added.

Van Steenberg also said tasks such as disk-intensive tests do not accurately measure a 32/800's performance because the off-loading of most of those tasks to a disk processor leaves the application processor idle, which is unlikely to occur in a customer environment.

New CSA

CONTINUED FROM PAGE 55

the first place.

One interpretation of IBM's discount program is that it's a knockout tactic aimed at clearing out competition. With competitors gone, IBM would be able to control the market and could tune its profit margins at its pleasure — at the expense of buyers.

Those inclined to suspect the worst may recall that IBM has previously been the subject of scrutiny by the U.S. Department of Justice for allegedly achieving monopoly status.

A more charitable view of the industry giant would hold that the new CSA is part of a healthy trend to bring customer charges in line with costs, which are steadily declining. If IBM's profits were greatly higher than its service expenses — particularly in well-maintained shops — then third-party vendors' profits were probably also too high. Industry experts point out that service charges are assessed according to what the market will bear and are not based on cost with a reasonable margin added. And third parties fix their service prices in relation to IBM's.

What is most likely is that IBM has found that its profit margin will not diminish — and may actually increase — with CSA because "nuisance" calls from users will be reduced once CSA guidelines are followed. Why should the same not be true for third-party vendors? And why shouldn't all service vendors be able to give back some of the profits, which were perhaps a bit larger than would have been absolutely fair?

But users would do well to wait for responses from third parties. Just imagine the world three years from now if there are few, if any, third-party maintenance companies. Where will the user be then? The user will have no alternative vendor and, therefore, no market leverage. The impetus that brought forth the Enterprise Maintenance Agreement and CSA from IBM will be gone.

Users may be getting a reasonable price from Big Blue, but without competitive bids, they won't be sure. So users should give third parties a chance to reply with their best shots. If they cannot keep up, then users will have little alternative but to go solely with IBM for maintenance. As the Joni Mitchell song goes, "Don't it always seem to go, that you don't know what you've got 'til its gone?"

Gibson is a *Computerworld* senior writer

Forms thriving

CONTINUED FROM PAGE 55

traditional forms market, according to Luft.

Whether other forms businesses will jump on the electronic bandwagon is open to speculation.

"That's a hope. At this point there is not much talk about what they might do. The forms industry is extremely conservative. They're educating themselves. I think electronic forms are a big threat, and think they are beginning to see it as such," Luft says.

The market for electronic forms products includes software, dedicated hardware add-ons and turnkey systems. Industries with high-volume forms output, such as banking and insurance, will be among the first to take advantage of the cost savings that electronic forms can offer, Luft says.

Electronic vs. preprinted

Preprinted forms are more expensive because they must be designed, printed and warehoused. Any changes to forms means tossing out the old in favor of the new.

Electronic forms, however, can be edited on-line, thus eliminating waste of outdated preprinted forms, Luft says. Because the form is stored on-line and printed simultaneously with data on a laser printer, there is no need to establish storage space for paper forms.

Standards do not exist within the electronic forms industry, making migration from centralized and desktop printers difficult, Luft observes. "Having standards developed would certainly help the industry along," she says. "I haven't heard of work being done in that area."

Interpress not a standard

Xerox Corp.'s Interpress language connects both high- and low-end printers. "But at this point, Xerox is the only one using it, so it's not an industry standard by a long shot," Luft notes.

Multipart forms still need to be produced by offset printing because page printers cannot produce multiforms efficiently. Some software mimics multipart forms, but the forms are not color coded.

"People want to run high volume without setting up paper," Luft comments. "You could label each sheet customer copy, shipping copy, but it's harder to differentiate them. It's a software issue and they're working on it."

Personal computers will play a large role in designing forms because interactive what-you-see-is-what-you-get workstations can help design form output. As systems become more sophisticated and costs decline, electronic forms are positioned for explosive growth, according to the Datek study.

Increased availability of affordable, low-end page printers and improvements in software and controller design will help push the electronic forms systems into new application areas, the study concludes.

Genrad offers DEC-based test system

CONCORD, Mass. — Genrad, Inc., a reseller of Digital Equipment Corp. systems for technical applications, has announced a 32-bit host system designed to support Genrad's test-generation and test-data management applications.

The Genrad 3200V Computer System is based on the DEC Microvax II and DEC VMS operating system. It is packaged with Genrad's new ATG-32 automatic test-generation software to perform off-line test program preparation for Genrad's 227X family of in-circuit/functional test systems. The package reportedly allows users to develop 227X test programs four to eight times faster than Genrad's previous system, which was based on the DEC PDP-11.

Other applications supported on the 3200V include Genrad's Datatrace-32 relational data base system, test-procedure management with Genrad's GRnet networking and Genrad's GRutilities software package of VMS tools.

Standard features of the 3200V include 9M bytes of random-access memory and two 160M-byte disk drives.

A basic system costs $58,900. A system start-up package, including software licenses, documentation, training diagnostics and basic 12-month system hardware and software support costs $9,800.

Imagen recasts its printer line

SANTA CLARA, Calif. — Imagen Corp. has dropped two of its Imagestation nonimpact printers and lowered the price of its high-end model by 17%.

The company is stopping production of the Executive and Designer Imagestation printers, which were introduced in 1985.

They were later replaced by the Innovator, an 8 page/min printer featuring additional memory with 1.5M bytes of random-access memory.

The company said the Innovator now will be known as the Imagestation and its price has been cut from $7,200 to $5,995.

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Which is surprising since w
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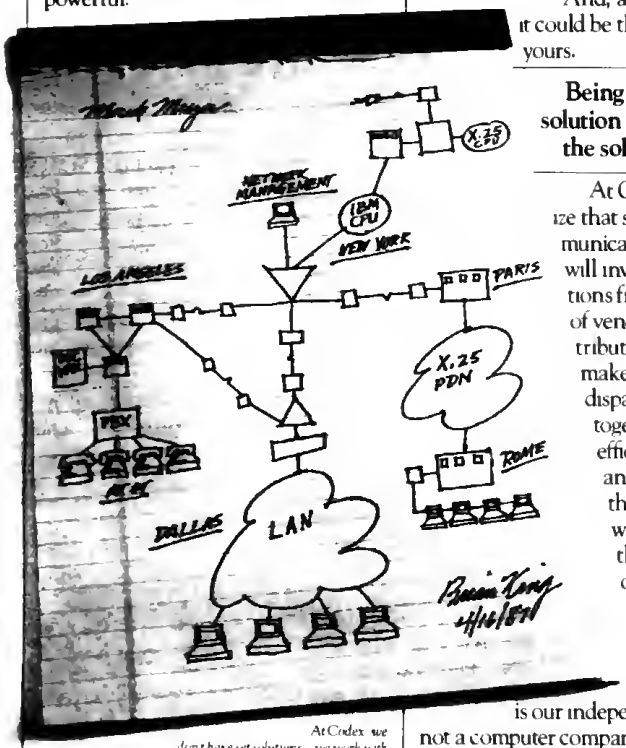

At Codex we don't have set solutions – we work with your current environment. Which is why we spend a lot of time drawing diagrams like this

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At Codex, we realize that solving communications problems will involve contributions from a variety of vendors. The contribution *we* want to make is to tie those disparate elements together into an efficient network – and then give you the tools with which to manage that network on an ongoing basis.

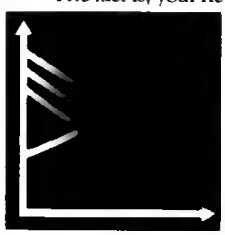
Perhaps Codex' greatest advantage is our independence. We're not a computer company. We're not a phone company. We're a network company. So, in our 25 years of designing network solutions, we've worked with all sorts of equipment companies. And we've worked in countries all over the world. So we can maximize the performance and functionality of all the pieces of your network, regardless of which vendors they came from. Or where they are.

But simply designing solutions isn't all we do. We also support our solutions with a wide breadth of networking products. Our history of innovative product capabilities means you're getting reliable, high-quality communications products that will make your particular network as productive as possible. Because we address a variety of areas, we're never in a position of trying to force fit a particular technology into a solution. So we're able to analyze your needs objectively. The result? A productive, efficient network. Which, after all, is the only kind of network anyone wants.

If you're planning on business growth, your network company should be planning on growth, too.

Compatibility isn't the only issue facing you when you set out to solve network problems.

The fact is, your network constitutes nothing less than an investment in the future of your business. And so it is absolutely critical that



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that investment is protected.

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1962

Codex develops its first data communications product for secure government applications

1967

Codex announces the first commercial 9600 bps modem. In 1976 our technology is adopted as the international standard by the worldwide CCITT committee

1975

Codex announces the first statistical time division multiplexer and pioneers the concept of network control

1985

Codex introduces gateways that allow separate networks to be combined

1985

Codex introduces the first 19200 bps modem with built in network control as a standard feature to optimize throughput and minimize downtime

Codex hasn't just developed a lot of networking solutions. We've practically developed the whole business of networking.

We understand that a network solution has to be capable of accommodating growth. Better yet, we actually design our networks so that they can spark growth within your company – helping to drive it by being a vital and powerful corporate resource.

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When you call Customer Service you've got the whole company on the line

To help us further accommodate your company's future growth, Codex is very active in industry standards committees, helping to create the kind of "open architecture" that will allow you to link equipment from many vendors in a more productive way. With that kind of support, your network will be able to grow by leaps and bounds. And your business along with it.

For years, we've worked with some of the best-known companies in business. Isn't it time we worked with you?

Codex is currently working with 97% of the Fortune 100. These companies, like yours, have to rely on their network for success. And, since they're considered to be among the most successful companies in the world, it would appear that our network solutions are working. And that the experience we've gained from those associations and others can be put to work just as successfully for your company.

In fact, in a recent *Data Communications* survey, many of these and other companies consistently ranked Codex first as the networking vendor they preferred in categories ranging from best price/performance to technology to customer support.

And of course, beside working for successful companies, we're also backed by a successful company – Motorola.

How can you find out what Codex can do for *your* applications?

You can start by calling Codex at **1-800-426-1212, Ext 247.** Or write to Codex Corporation, Dept. 707-47, Maresfield Farm, 7 Blue Hill River Road, Canton, MA 02021-1097.

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Of course, the book should be informative. After all, it took 25 years to write.

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The Networking Experts

See Codex at booth #1621 at the ICA show, May 18-21.

NEW PRODUCTS

Processors

Acrosystems Corp. has announced the **Acro-400** stand-alone data acquisition and control system.

The system comes with menu-driven operating software. It features flexible input formats to handle seven common thermocouple types with cold-junction compensation, DC levels up to plus or minus 10V and process currents. The standard unit provides 16 differential inputs capable of either voltage or thermal signals, one analog output and 32 lines of digital I/O.

Communications with the computer are through the standard RS-232C and RS-485 interfaces.

The Acro-400 costs $1,295.

Acrosystems, 66 Cherry Hill Drive, Beverly, Mass. 01915.

Bicc-Vero Electronics, Inc. has announced a **single-board computer** with dual-port random-access memory.

The VMEbus-compatible data processing modules are available with single or double high-front mounting panels. Features include a Motorola, Inc. 68000/68010 processor operating at 10 MHz, 128K-byte erasable programmable read-only memory space, 512K bytes of read-only memory, zero-wait state memory, system control function, two serial ports and a seven-level interrupt handler.

The single board computers are priced from $575 to $945.

Bicc-Vero Electronics, 1000 Sherman Ave., Hamden, Conn. 06514.

Graphics systems

Ramtek Corp. has added the **Ramtek 4327** to its 4320 series of graphics terminal products designed for high-resolution color, two-dimensional graphics display.

The Ramtek 4327 features a proprietary transform-and-draw accelerator and proprietary very large-scale integration circuitry. It consists of a display processor and optional CRT display. Resolution is 1,280 by 1,024 pixels, and 256 colors can be displayed simultaneously from a palette of 16.7 million.

The Ramtek 4327 can be configured with up to 10 planes of 1,280 by 1,024 bits of refresh memory. The base unit contains 400K bytes of user-available display-list memory.

The Ramtek 4327 is priced from $15,995.

Ramtek, P.O. Box 58204, 2211 Lawson Lane, Santa Clara, Calif. 95052.

Terminals

Intecolor Corp. has announced its **3815**, **3825** and **3865** color graphics display terminals.

The terminals feature an eight-color, 13-in. display and incorporate the vendor's Auto Ranging power supply, which accepts power inputs across AC voltages from 97 to 250V and line-frequency inputs of 40 to 70Hz. The terminals also take advantage of automatic beam-current limiting and are command-set compatible with Intecolor's 19-in. terminals.

The 3815 and 3865 offer character graphics resolutions of 160 by 192 pixels. The 3825 has 480- by 384-pixel dot-addressable graphics capabilities.

The 3815 costs $2,795, the 3825 costs $3,315, and the 3865 costs $3,195.

Intecolor, 225 Technology Park, Norcross, Ga. 30092.

Printers/Plotters

JDL, Inc. has added **Wide Body Text**, an extra-wide printing capability for its C-size color printers and plotters.

The feature is said to allow the devices to print a full 16-in., or 160 characters, of letter-quality text.

The Wide Body Text feature is implemented through the use of optional credit card-size read-only memory (ROM) cards, each with up to 32K bytes of ROM embedded in it, according to the vendor.

The Wide Body ROM card can be used with any of the printers' or plotters' five standard fonts, including Courier 10, Letter Gothic 12 and Gothic 17, as well as with specialized fonts and pitches, the vendor said.

The Wide Body Text option costs $125.

JDL, Suite 104, 2801 Townsgate Road, Westlake Village, Calif. 91361.

Western Telematic, Inc. has introduced the **Lasernet PSU-42C** and the **Lasernet PSU-82C** printer-sharing units.

The units are said to feature up to 2M bytes of memory each and to accept simultaneous input from all ports.

They offer no-wait data transfer and the capability for users to customize Lasernet input ports to meet individual equipment requirements, according to the vendor.

The units allow up to four or eight users, respectively, to share one parallel and one serial printer or plotter simultaneously.

Bit/sec. rates are selectable from 300 to 19.2K bit/sec.

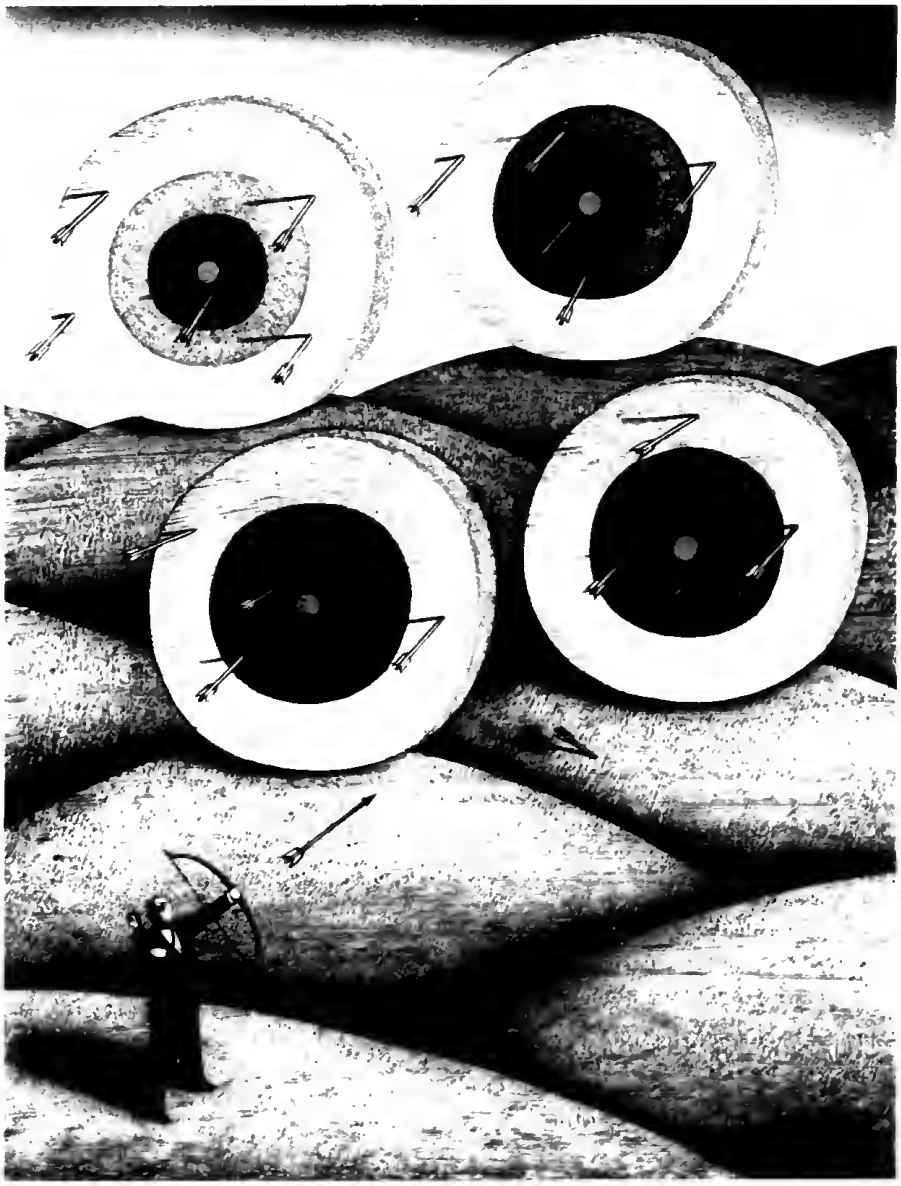
Pricing on Lasernet PSU-42C ranges from $795 to $1,295; pricing for the Lasernet PSU-82C ranges from $995 to $1,495.

Western Telematic, 2435 S. Anne St., Santa Ana, Calif. 92704.

COMPUTERWORLD

SPOTLIGHT

DEC-COMPATIBLE SOFTWARE



Vertical industries loom large in Digital Equipment Corp.'s marketing strategy, and third-party software vendors are quick to follow through on its aggressive targeting.

INSIDE

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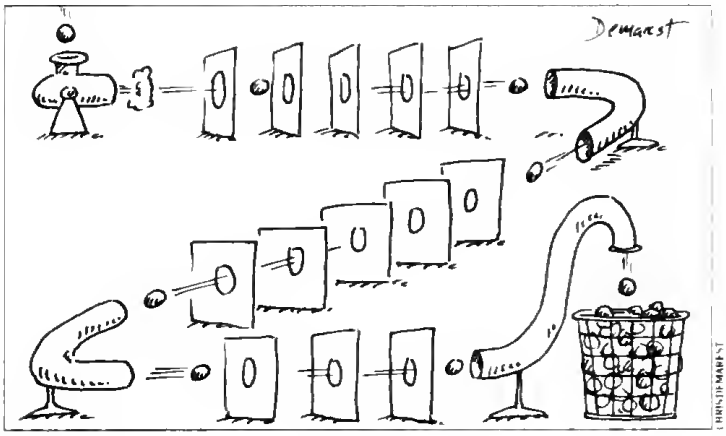
Users reap benefits of added functionality as DEC and software vendors connect to deliver industry-specific solutions.

INDUSTRY FOCUS SPURS ACTION

BY BOB RANDOLPH



"We found the integrated banking system we needed, and it was available on a VAX system. So we bought a VAX," says James Aston, president of Financial Accounting Services, Inc., a savings and loan service bureau in Pittsburgh. According to Aston, the combination of Profile, an integrated banking system from Sanchez Computer Associates (SCA) in Malvern, Pa., and Digital Equipment Corp. hardware has added considerably to his company's ability to address the banking application needs of its 125 savings and loans associations spread across five states.

Situations like this one are becoming more common as third-party software vendors line up to provide industry-specific application solutions to run on DEC equipment. The trend toward specificity of focus benefits everyone, including DEC, which frequently gains entry into new businesses on the basis of well-tailored third-party software; the software suppliers, which benefit from the marketing leverage of being closely aligned with a technologically progressive computer system supplier; and users within industries, who find solutions to problems that have not been previously addressed.

During the past two years, the computer industry in general has been experiencing a well-publicized slump, inflicting a negative impact on relationships between many hardware vendors and third-party software suppliers. At the same time, however, DEC's emergence as a full-service vendor, with its focused, hell-bent-for-leather thrust into a broad range of vertical markets and heroic status based on financial performance, has lent a new level of excitement — if not frenzy — to the third-party software applications market.

DEC's shift to vertical markets, its large installed base and recent financial results that far outstrip the rest of the computer industry have been seized upon as a key opportunity for third-party software suppliers. A new platform has been created for application solutions suppliers as well as for those vendors that supply combined hardware and software solutions, traditionally called original equipment manufacturers or value-added resellers (VAR).

While the list of vertical markets that DEC is pursuing is quite long, four markets in particular — banking and finance, health care, aerospace and electronics — merit a close look, based on the levels of third-party interest and vertical software activity they are stimulating.

The banking and finance vertical market has traditionally been a stronghold of IBM and, before its merger with Sperry Corp., to become Unisys Corp., Burroughs Corp. as well. While IBM remains a leader in this market, DEC strongly challenges that leadership position. The sustaining force of this threat is the number of third-party software suppliers that are providing an applications umbrella for DEC's VAX computer systems.

One of those companies, Computer Aided Decisions, Inc., a Boston-based company, sees the existence of its portfolio optimization package as a sort of pull strategy to get DEC more involved

Randolph is director of International Data Corp.'s DEC Advisory Service in Framingham, Mass.

Industry

FROM PREVIOUS PAGE

in the financial market.

Tom Roginski, director of marketing at Computer Aided Decisions, says, "We've been in the business since 1981 and feel that we have done a lot to drag DEC into the financial market."

SCA, on the other hand, sees itself as the recipient of a beneficial push from the DEC approach to computing, which is based on layered software, seamless networking and a highly interactive operating system. These add up to a rich software development environment as well as a means to widely distribute computing resources.

SCA's primary product, Profile, is a comprehensive, computerized banking system designed to automate both a bank's front- and back-office functions. It is composed of a set of individual application modules anchored in an on-line data base system. At the center of the application system is a nucleus that manages the activity of the application modules and controls all data flow. The modules include deposit processing, on-line data capture, loan processing, office automation and financial management.

The key strength of SCA's application package is the flexibility it provides for the user to define his own reports, queries or report types. According to Financial Accounting Services' Aston, "One of our time-sharing users pointed out that in bringing his application on-line, we had forgotten a query that he used to perform frequently. We had the query up and running in one day, whereas with other Cobol-oriented systems, it would have taken at least a week."

DEC goes to the hospital

Pentamation Enterprises, Inc., a Mendham, N.J.-based firm, is a health-care applications solution supplier that selected DEC's computer systems as part of its continuing thrust into the integrated hospital systems market.

Since Pentamation was founded about 15 years ago by four ex-IBM employees, the company's original product focus was on IBM mainframes. For a long time at the company, "anything other than IBM was heresy," says David Shor, a Pentamation marketing specialist.

When it came time to extensively upgrade its applications some five years ago, Pentamation completed an exhaustive evaluation of available computer hardware. "We looked at everything from IBM systems to Japanese computer systems," Shor says. The company selected the VAX system because it offered the key elements Pentamation felt it needed for its market — expandability and networking. About 90% of SCA's business is now derived from sales of systems based on DEC.

Using the VAX as a base, Pentamation developed a hospital information management system called the Leadership series. This product consists of the Patient Management System, Financial Management System, Clinical Support System and Decision Support System.

Up into aerospace

The aerospace application solution market is populated with a number of small to medium-size companies that offer a variety of manufacturing packages tailored to the unique requirements of aerospace engineering, such as stress analysis, structural analysis and telemetry data acquisition. Many of these applications were once run on large-scale computers such as those manufactured by Control Data Corp. and IBM. The increasing computational capabilities of minicomputers in general and the DEC VAX system in particular, however, have made it possible to downsize many of these applications.

The electronics application solutions market contains a number of key companies that have opted to jump on the DEC bandwagon. Companies such as Applicon (a division of Schlumberger Ltd.) in Ann Arbor, Mich., Calma Co. (a subsidiary of General Electric Co.) in Milpitas, Calif., and CAE Systems (a subsidiary of Tektronix, Inc.) in Austin, Texas, are supplying applications that fit the needs of the electronics industry.

These needs are typified by the requirements of designing electronic devices with computers. The process is computer-aided design and manufacturing (CAD/CAM), or the underlying ability to create engineering designs using complex software to store and manipulate graphic images on either a monochrome or color display.

Many-sided relationship

The key for many of these DEC-compatible application suppliers is the relationships they have formed with DEC, some of which have been in place for 10 or 15 years. They go back to DEC's 16-bit computer systems called PDP-11s, which were and still are, to a lesser extent today, the delivery platform for many application suppliers.

Generally, there are two sources of vertical industry application software: companies that are independent software suppliers and those that are closely allied with DEC. DEC allies itself with application software vendors in three ways. The first approach is called referral, which means the vendor's product is listed in a catalog DEC provides to potential customers. The other approaches include the Cooperative Marketing

Continued on next page

Software independents seek new vehicles for growth

The largest independent software suppliers are now taking Digital Equipment Corp. seriously as a vehicle for growth, which has not always been the case. While some companies such as Software AG of North America, Inc. in Reston, Va., ported their data base management systems to the VAX line as long ago as 1982, many other large independent software suppliers remained focused, until recently, on IBM mainframes.

The stakes, however, are growing too high for this single-vendor vision. The disastrous financial performance of large software vendors in 1986 signaled the urgent need for some change of focus. Furthermore, there is strong reason to believe that the market has not so much dwindled as changed shape to one that is much more application-defined.

"The overall market for the application tools and application solutions market was $17.4 billion in 1986, and the independents' share was $11.9 billion," says Mark Pine, a research analyst at Framingham, Mass.-based International Data Corp. "By 1991, that same market is expected to reach a whopping $29.5 billion." The independents' share should reach approximately $19.5 billion.

The independent software industry falls into three major segments: systems and utilities, application tools and application solutions.

Systems and utilities software is designed to operate basic hardware functions. It includes tools like operating systems, programming languages and communications software. Hardware vendors dominate this segment, since this type of software is closely tied to the equipment they sell and, in many cases, represents their real added value or market differentiation.

Applications tools allow users to retrieve, organize, manage and manipulate data or data bases. This group includes DBMS packages, program design and development aids. Hardware vendors and independent software vendors share this territory.

Application solutions software is designed to provide ready-made answers to specific problems inherent in either a vertical industry or a general business function. It is in this segment of the market that independent software vendors dominate and here, particularly in industry-specific application solutions, that they see their greatest prospects for growth.

In pursuit of their piece of this pie, independent software vendors are scrambling for competitive advantage, using strategies ranging from mergers and acquisitions to rapid product deployment in the medium-scale computer market.

Mid-scale hardware

Actually achieving the sales and share figures projected for 1991 is not going to be easy. The slump in hardware shipment rates in the last two years has had a very negative impact on the independent software industry. The rapid growth of years past has cooled, and software vendors will have to hustle to regain their earlier momentum.

In 1984 and 1985, Cullinet Software, Inc., a Westwood, Mass.-based software vendor, experienced sales growth in the 50%-plus range and then, almost overnight, saw its revenue growth slump to 0%. Management Science America, Inc., another leading software vendor, located in Atlanta, watched its growth fall from a 43% rate to only 28% in 1986.

> **INDEPENDENTS are scrambling for competitive advantage, using strategies ranging from mergers to rapid product deployment in the medium-scale market.**

These companies have hit the proverbial wall that long-distance runners describe. The wall for these traditionally IBM mainframe-oriented software vendors was the slowdown in mainframe sales. Unit sales of mainframes peaked in 1984, and sales have been flat ever since.

Adding to the problems of mainframe-oriented software independents is increasing competition from IBM. With the introduction of the 4300 series in 1978, IBM signaled the beginning of its strategy to derive as much as 50% of its revenue from software sales, spelling trouble especially for those companies specializing in DBMS, query language and report writer products.

As constraints in the mainframe market began to be reflected in growth figures, independent software vendors were forced to look for new sources of revenue. Several turned to personal computer software, only to discover other, different, limitations. The PC software market would not support sustained long-term growth, especially if that growth involved carrying the overhead of a large, expensive, product-hungry sales force. In addition, the consumer-oriented nature of the PC software business required a much different sales approach.

For industry-oriented applications solution software to become a truly viable business, three important factors had to come together in the medium-scale hardware market.

First, the medium-scale systems — hardware and systems software — had to provide production systems capability similar to that available on IBM mainframes. Second, the marketing strategies of medium-scale hardware vendors had to be clarified and solidified in terms of their commitment to the commercial market. And finally, the marketplace had to accept medium-scale computers for production-oriented commercial applications. These requirements were met during the last three years by many medium-scale computer vendors — especially DEC.

New strategies, markets

Today, the major independent software companies are in the process of catching their second wind. That recovery may be slow and in some cases painful. The essence of the recovery for many of the leading vendors will be new strategies, new markets and new products.

Two central themes recur in the strategies' being implemented by both leading and second-tier software vendors. The first is a shift in emphasis to application solutions. The second involves making those application solutions available on medium-scale computers, systems in the $100,000 to $1 million range.

Cullinet typifies the shift to new strategies and new markets. In September 1986, the company announced a strategic focus designed to increase revenue from applications solutions from the current 27% to 50%. The plan calls for providing these application solutions on three platforms — PCs, the DEC VAX and IBM mid-range and mainframe systems. Cincom, another major player, has been aggressively pursuing the VAX market with DEC-compatible products like Control, a manufacturing resource planning system, and Ultra, an interactive data base system.

In the future, we will see more independent software companies moving in the same directions.

BOB RANDOLPH

Industry

FROM PREVIOUS PAGE

Program (CMP) and the Systems Cooperative Marketing Program (SCMP). Application software vendors may find themselves moving from one to another as they establish themselves in the vertical markets or industries that DEC is actively pursuing.

For example, an independent software supplier may decide to list its products in one of DEC's vertical industry catalogs and yet not want a contractual relationship. The referral approach is strictly an arms-length arrangement. On the other hand, the application vendor may go one step further and try to qualify for CMP or SCMP. To do so, it must allow DEC to evaluate its business plan, its volume of sales, the company's long-term potential and existing customers' impressions of its methods of installation, its customer support and satisfaction.

In each of the vertical markets DEC pursues, these three types of relationships are used to varying degrees. In the banking and finance market, for instance, about 75% of the application solutions are by referral.

Clearing the channels

Within the last two years, DEC has initiated a major shift in its relationships with third-party application suppliers, thereby enhancing those relationships and facilitating a whole new momentum in the marketplace.

Recognizing that an aggressive move into vertical markets would require partners, DEC sought to reduce the competition between itself and its third-party suppliers. The corporation then implemented a policy of awarding its sales force partial credit for hardware sold either by the sales force or the third-party marketing partner. The removal of this channel conflict made a tremendous difference for DEC and the third-party applications suppliers.

According to one company that is now very satisfied with its relationship with DEC, "We had some real ups and downs with DEC. We found ourselves frequently competing with the DEC sales force."

The channel conflict issue was particularly irksome to the OEMs and VARs. DEC gave these vendors an opportunity to enroll in its SCMP. This contractual arrangement allowed the SCMP member to do the entire job of selling with or without the assistance of the local DEC sales representative. Since the DEC agent was getting credit for the hardware portion of the sale, he had a lot of incentive to cooperate with the SCMP. The difference has been dramatic, one SCMP member says.

What DEC adds to the party

DEC brings a number of benefits to these vertical markets. The most frequently cited contributions are the following.

- Price/performance.
- State-of-the-art technology.
- User friendliness.
- A powerful software development environment.
- Readily available software and hardware support.
- Additional layered software that makes the system purchase for a particular application more cost-effective.
- Reliability.
- Expandability and migration.
- Networking

RECOGNIZING that an aggressive move into vertical markets would require partners, DEC sought to reduce the competition between itself and its third-party suppliers.

According to health care applications vendor Pentamation, DEC's frequent product advancements ensure that the customer will be able to keep pace with changing technology.

A key concern for most third-party application suppliers is whether the total system price they charge their customers leaves enough room for a reasonable margin on their value-added portion of the system. For some market segments, the system that is easiest to sell and offers the greatest margin costs around $100,000 for both hardware and software. One health-care vendor suggested that this figure was closer to $400,000 or $500,000 for the health care industry.

Systems consisting of $1 million in software and the same in hardware were not uncommon for this same health care applications provider. These figures offer some insight into the heavy spending that seems to be going on as the health care industry moves from a cost-plus mentality to a profit-and-loss orientation.

Another major benefit along the lines of price/performance is the existence of the Microvax system which sells for $50,000 to $100,000. This system's price has opened new markets for many applications solution suppliers.

Computer Aided Decisions saw the combination of its sophisticated portfolio management package, the Expanded Portfolio Valuation System (EPVS), with the Microvax providing its customers with a real decision point. The lower cost of a solution on the Microvax forces money managers who are still using

time-sharing services to at least consider bringing this application in-house. EPVS is a real-time, on-line interactive research portfolio management and trading system that automates the entire investment process. It also provides performance measurement and accounting information.

Transportability also weighs heavily in DEC's favor. Computer Aided Decisions says its primary reason for choosing DEC as a vehicle for its application was that it would not have to rewrite the software to run on both large and small systems. Another aspect of DEC's systems that many vertical industry software suppliers regard as a critical difference is the real-time, on-line capability they provide.

Anamet Laboratories, Inc., an aerospace applications supplier based in Hayward, Calif., chose DEC because of DEC's pricing structure and the general-purpose nature of its systems, which support several major applications concurrently.

THE PRESENCE of DEC's already-active third-party supplier base counts for a great deal with many software suppliers.

The presence of DEC's already-active third-party supplier base counts for a great deal with many software suppliers, particularly of the OEM variety. One applications vendor was particularly pleased with its ability to find third-party peripherals for the systems it configured and sold to its customers.

An aerospace applications vendor found major benefits in DEC's large engineering and scientific installed base and the company's frequent introduction of machines. Compatibility across a broad range of performance results in the ability to send a single magnetic tape for any size VAX.

How users benefit

A general equation describing the benefits users reap from the combination of DEC hardware and an application vendor's software can be summed up as follows: Managing change equals the DEC VAX system plus industry-specific software.

The health care industry, which is currently undergoing a period of considerable turmoil, is a prime example of how these collaborations can assist the process of market adjustment. According to Ken Greenwood, a DEC consultant relations manager with 14 years of experience in the health care market, hospitals are now facing an economic situation that forces them to operate as profit-and-loss businesses. "Those that can't make the shift from the old cost-plus form of operation are going out of business at the rate of 200 per year," Greenwood says. "Many are even becoming, or diversifying into, health maintenance organizations or insurance companies to enhance their revenue and, hopefully, their profitability."

One result of this, according to Greenwood, is that health care institutions are recognizing the need for small, fast systems that protect their investments and are easier to maintain.

In the banking and finance market, the value of DEC and its application solutions vendors is based on the assessment that important changes in the banking area have occurred in the last few years.

David Pepin, DEC's financial industry strategy and market development manager, says, "In the banking area, the needs have changed dramatically. Before 1968, it was an easy, stable business environment that didn't change much. As people and institutions got smarter financially, that is, understanding what a good financial deal was — interest rates, return on investment and the like — a different set of demands were placed on financial companies. As people began to move their money around, looking for a better deal, the industry began to experience profit-and-loss squeezes. They had to find new ways of making money."

Pepin cites what DEC regards as an inherent systems

problem. The core of this systems problem is that the older financial systems are based on accounts and not people. This fact has given rise to the hue and cry for completely integrated financial systems. Those older systems are no longer cost-effective because of their inherent lack of flexibility in keeping up with the changing needs of the customer. Pepin further suggests that "the financial companies have to become low-cost producers to be competitive, and that makes the older systems wrong for the job. The ideal case is to be completely flexible while appearing to the end user as a turnkey solution."

The joint value of Computer Aided Decisions' software and DEC systems, according to Computer Aided Decisions' Roginski "is the speed of processing and real-time — for that is the critical requirement in financial markets." A need exists for highly redundant, real-time systems. Without high reliability, Roginski says, "you can't play the game." He cites an example in which a 4-sec. time delay in receiving a stock price can cost a money manager with a large client — one with transactions in the millions of dollars — a huge sum of money. The ability to react to stock price fluctuations is a key result of the combination of DEC hardware and Computer Aided Decisions' software

In the electronics market, one CMP, the Organization for Industrial Research, described DEC as a company that understands the need to bring multiple sets of solutions to bear on a manufacturing problem. This understanding, when coupled with DEC's willingness to provide much-needed solutions integration, was the key benefit that the CMP and DEC brought to the electronics market.

The MacNeal-Schwendler Corp., an aerospace applications supplier in Los Angeles, says it believes the primary benefit to the customer is user friendliness and compatibility. Its application, MSC/Nastran, a general-purpose program that addresses a wide variety of engineering problems using the finite-element method, is particularly suited to static and dynamic structural analysis, heat transfer, aeroelasticity, acoustics and electromagnetism. Since MSC/Nastran creates a machine-dependent data base for subsequent processing, MacNeal-Schwendler says it sees the VAX family as unique, in that the user can do the initial processing on a Microvax and then continue the run on a bigger VAX system.

A HUE and cry has risen for completely integrated financial systems.

Market census

There are approximately 80 DEC-compatible application suppliers to the health-care market. Some of the key contributors of software include companies such as McCormack & Dodge Corp., Health Systems International, Inc. (HSI), Shared Medical Systems Corp., McDonnell Douglas Automation Co. and the Mumps Collaborative in Newton, Mass.

McCormack & Dodge provides financial applications that are customized for health care institutions. Its relationship with DEC is a referral one. Other application suppliers that have a contractual relationship with DEC include companies such as McDonnell Douglas Automation, which was an OEM before becoming an SCMP. Other companies providing health care application solutions as combinations of hardware and software under DEC's SCMP program are Shared Medical Systems, which sold $30 million in DEC hardware, and the Mumps Collaborative. What these SCMPs have in common is that the solutions they provide tend to be large-scale turnkey hospital information systems.

Another company strictly software oriented that provides its application solutions under the DEC's CMP program banner is HSI, which targets departmental systems for case-mix analysis

Some key application solution companies in the banking and finance market are companies

such as National Computer Systems in Dunnwoody, Ga., a banking trust system SCMP; Boston's Computer Aided Decisions, which provides an investment portfolio optimization package, and McDonnell Douglas, which offers an international banking package.

Next-generation banking

Two companies with which DEC is working very closely in hopes of coming up with the next generation of integrated banking systems are Saddlebrook Corp. and SCA. SCA is an example of an applications solution supplier that does not fit the mold of third-party applications providers. Although officially classified by DEC as an OEM, SCA does not quite match that categorization.

The source of this maverick status is SCA's distribution strategy. The company has chosen to provide its banking system to other distributors — such as financial service bureaus and banks — that provide services to corresponding banks and other financial institutions.

Another aspect of SCA that makes it different is that the company chose the standard MUMPS language, developed by Massachusetts General Hospital, rather than Cobol, as an implementation language. SCA says it believes this affords a unique software performance advantage with DEC's implementation of the MUMPS language. SCA evaluated MUMPS compilers offered by IBM and other computer vendors before deciding to go with DEC. But according to Steve Ryan, a marketing specialist at SCA, "DEC MUMPS had 20 to 30 times the performance of other vendors' compilers."

While IBM holds forth in back-room processing, the kind of performance and flexibility SCA is offering will take the banking and finance industry closer to what DEC's Pepin calls "tomorrow's software today."

Reaping fortunes

The fortunes of many DEC-compatible applications vendors have improved considerably, especially if a close working relationship with the company has been formed. In 1986, Computer Aided Decisions decided its normal growth rate should be 20%. Already this year, the company has seen a dramatic upsurge in business, which makes it look like growth will be 100%.

This kind of dramatic increase is the result of the company's relationship with DEC and, accordingly, its access to the DEC sales force. To enhance its leverage, Computer Aided Decisions chose the tack of spending a lot of time working directly with the DEC sales force. The primary focus of this contact is to educate the sales force about Computer Aided Decisions' product and the financial market in general.

Another important aspect of this direct involvement with the sales force is the ability to share contacts at the local level. Computer Aided Decisions can direct the DEC sales force to its high-level contacts based on relationships built during years in the financial business. This direction and support to the DEC sales force must enhance Computer Aided Decisions' receptivity.

THE fortunes of many DEC-compatible applications vendors have improved, especially if a close relationship with the company has been formed.

Another example of overall company change attributable to playing in the DEC-compatible world is typified by a company in the electronics market. In 1983, roughly 60% of this firm's business lay in the DEC market. In 1984, its DEC business fell to 40%. The introduction of the Microvax was a breakthrough product, opening whole new markets into which the firm could move its application. The company is now back to deriving 50% of its business from the DEC world. It was particularly pleased with DEC's openness in sharing product plans 18 months in advance.

Another aspect of this particular vendor's relationship with DEC was the feeling that it was part of DEC's computer-integrated manufacturing strategy. DEC has been generous with its assistance for this company's participation in trade shows, providing loan equipment and brochures promoting the third party's applications products.

As is the case with any business situation, there are likely to be some negatives. One company, an SCMP for two years, feels that it has yet to derive real benefits from its relationship with DEC. The company says it has not received much support from DEC and that it has been ignored by the local sales agents — probably because it bought its peripherals from third-party suppliers rather than DEC. Although there are roughly 474,000 DEC systems of various sizes currently installed, the large installed base of VAX systems is clearly the strategy for the future. What makes these systems most attractive to third-party suppliers is the fact that all the VAXs share a common architecture and a common operating system.

When the VAX-11/780 was introduced as the first member of the VAX family in 1978, it was positioned strictly as a scientific and engineering machine. However, large-scale VAX systems needed to come into their own in terms of systems capability before third-party activity could really take off again. A Cobol data base management system and a mature operating system — VMS — had to exist to make the VAX an attractive system for the commercial market.

VAX compatibility allows the software vendor to write one application with a common user interface and set functionality across a wide range of performance, from 1 million to 50 million instructions per second. The major economic impact on third-party software suppliers is the reduction of incremental development or maintenance costs. •

Gaining admittance through hospital's business office

BY DEBORAH COOPER

Burke Rehabilitation Center, a 110-bed hospital in White Plains, N.Y., is world-renowned for its work with victims of strokes, Alzheimer's disease and spinal cord damage.

Although affiliated with the medical school at Cornell University and New York Hospital, Burke Rehabilitation manages its business and accounting services independent of these two larger institutions. It also makes all computer purchases separately.

In October 1986, Burke decided to reorganize and restructure its financial operations to achieve better time and cost efficiencies. It traded in a time-shared system from McDonnell Douglas Computer Systems Co. for an integrated turnkey financial management system built around Digital Equipment Corp. VAX computers.

No tinkering required

The McDonnell Douglas system had become outdated by the early 1980s, says Alex Zemcov, director of computer operations at Burke. "It was very expensive and never easy to use, but, most importantly, we sometimes waited months for reports, since our files had to be stored in McDonnell Douglas's offices in St. Louis.

"We wanted a general-purpose machine that we didn't have to tinker with. And we wanted software that didn't require us to monkey with the VAX/VMS operating system," Zemcov continues. Although, he says, there were "a bunch of strange, lunatic computers" throughout Burke, Zemcov decided the time had come to integrate its computing power by slowly phasing in DEC systems where possible. DEC equipment previously installed in Burke departments includes two VAX 8100s and one VAX 8600.

The software system selected by Burke was the Leadership series from Pentamation Enterprises, Inc., which features accounts payable, general ledger and budgeting, payroll, materials management and patient accounting modules.

Pentamation, founded in 1969 by four IBM account executives, now provides information systems to more than 1,300 health care facilities in the U.S. Although initially marketed to small community hospitals, some customers' facilities currently have more than 1,000 beds. The company, whose health care systems division is based in Mendham, N.J., predicts revenue of $100 million by 1988.

The marriage between DEC and the less well-known Pentamation has proven to be a happy one. DEC is the second largest hardware vendor serving the U.S. health care industry. More than 7,000 health care institutions have installed its equipment. Within specific hospital departments, such as laboratories, DEC ranks first, with software from more than 70 third-party developers running on its equipment.

Pentamation selected the VAX line because of its clustering capabilities. Clusters allow incremental growth to take place without the need for hardware upgrades each time additional processing is needed. The company's sales strategy has been to replace time-shared systems with its turnkey products, which cover a broad range of applications for different VAX computer configurations.

Alex Zemcov

Burke Rehabilitation Center installed the Leadership series on 25 VT220 terminals in its business office. Connected by an Ethernet local-area network, these terminals run on one VAX 8200 located in an adjoining building. Although the quadrangle of buildings was designed in 1900 by Stanford White, they are all connected by underground tunnels, making Ethernet's installation very easy, Zemcov says.

In addition to increasing the business office's efficiency, Zemcov says the new software has made staff members look more critically at their work. "Expectations have risen," he says, "and now they want reports on demand, not three months from now." Five letter-quality printers produce all the department's reports and billings as soon as they are completed.

Power to spare

However, even with Pentamation's software installed, the VAX 8200 can spare plenty of room, and Zemcov is, therefore, looking at other hospital departments and services that might tap this available power. "We are basically using the VAX only for data input and output and have really used very little of its CPU," he says.

Departments such as Pulmonary Medicine and Enzymology and services like the centerwide word processing and data base administration, are among the candidates for the VAX's extra bytes.

The center is also contemplating the purchase of two other health care software packages offered by Pentamation, according to Zemcov. The products under consideration are the Patient Management System, which maintains an interactive data base on patient demographic and historical information, and the Clinical Management System, which integrates patient services such as a pharmacy, lab and blood bank with their resulting orders, charges and reports. Burke may purchase these systems in the future.

Because Burke is not only a treatment center but also a teaching and research facility with many members of its staff holding faculty appointments at Cornell, Zemcov would like to migrate scientific materials, such as a small neurological literature search data base, from Burke's current base on the PDP-11/23 to the 8200. In addition, he says, he contemplates replacing the center's IBM 5520 with a Microvax II. •

Cooper is a free-lance writer based in Boston.

Shattering the aerospace barrier

BY SUSAN GRECO

In Bob Meihofer's business, timing and accuracy are everything.

Meihofer works for Grumman Corp., a Bethpage, N.Y., aerospace company that manufactures aircraft and tactical systems for the Navy, Air Force and Marines.

In the developmental flight testing of such equipment, Digital Equipment Corp. VMS real-time software is critical, says Meihofer, director of data systems operations at Grumman's Calverton, N.Y., facility. "The whole show could be over in a few seconds," he explains. "You have to be able to verify that you did achieve your test goals."

Bob Meihofer

At present, about 90% of the analysis and real-time software used for such tests is developed in-house, according to Meihofer. The reason, he says, is not a reluctance to buy but a shortage of commercial real-time software programs that meet his group's needs for testing everything from aircraft to missiles to ground-control systems.

Dataprobe, from BBN Software Products Corp. in Cambridge, Mass., is an exception, Meihofer calls it a "pseudo-real-time" program.

When a pilot is between maneuvers, Dataprobe is used for less time-critical tests, he says. The testing facility also uses the package for aircraft vibration analysis.

Dataprobe, which integrates data management, analysis and graphics, was originally designed for the Navy to reduce the amount of data involved in torpedo tests. The VMS package was developed as a commercial product last year, and it was officially released last month.

In addition to aircraft and missile testing, Dataprobe can be used to analyze recorded data from telemetry equipment, vehicle crash tests and wind tunnel tests. One of the "big three" auto makers is using the package to help design the "car of the future," says Michael Beek, director of special markets for BBN Software.

The program runs exclusively on the DEC VAX, and Beek indicates that a cooperative marketing agreement may be in the works.

Beek also says it is only a matter of time before a real-time version of Dataprobe becomes available. "I won't give any dates, but we're working toward real-time capability by the fourth quarter of '87," he says.

The Calverton facility created a Microvax II-based station called Mission Display for a real-time representation of a test area. Mission Display includes a three-dimensional modeling package similar to programs used by air traffic controllers. The color graphics program visually displays the vehicles being tested.

Meihofer's division collects and analyzes test information on a DEC network of three VAX clusters that are composed of eight VAXs and 20 Microvax IIs running under VMS. Some of the Microvaxes also operate with VAX ELN, a runtime executive.

For posttesting, in which real-time analysis is not needed, Grumman uses both in-house and third-party software. The Dsspla graphics package, originally from San Diego-based Integrated Software Systems Corp., which was acquired by Computer Associates International, Inc., is used throughout Grumman, according to Meihofer. Still, he says, he does not expect to see more real-time aerospace software designed for aircraft testing forthcoming from third parties any time soon. "It's an esoteric community that would use it," he explains. "You could sell it to us and maybe 12 other aerospace companies."

BBN's Beek agrees that aerospace firms' applications are fairly specialized. He believes, however, that the market holds potential for developers. "It's true that it is a narrow marketplace," he says, "but from a software perspective, it's deep." •

Greco is a free-lance writer and editor based in Boston.

Loan tracking and posting tool gives mortgage firm an edge

With System M, Sovran takes on Sears, GM and gets rid of a lot of paper

Sovran Mortgage Corp. is engaged in do-or-die combat with competitors that are larger and less fettered than itself, says John Nash, vice-president in charge of residential electronic data processing systems for the company, which is based in Richmond, Va.

Sovran, which ranks as the seventh largest mortgage company in the U.S. and specializes in servicing the secondary mortgage market, seems an unlikely underdog. In 1986, the company's assets came to a total of $7 billion, including closures of residential mortgage loans totaling more than $1.2 billion.

Those numbers are not enough to make the company complacent, however, because Sovran's business adversaries consist of Sears Roebuck & Co., General Motors Corp. and other similarly well-endowed "non-bank banks" that can offer a host of financial products and services unrestricted by federal banking regulations.

"These industrial giants have megabucks to spend on marketing and technology. We may be ranked seventh, but the top three are way above us," Nash says.

Automation catch-up

In 1985, as a means of gaining competitive advantage, Sovran decided to automate many of its loan tracking and posting functions. The goal was to be able to handle more cases and to be able to close them in one-third of the time.

The chosen tool was System M software from Saddlebrook Corp. in Cambridge, Mass., one of the nation's largest authorized distributors of Digital Equipment Corp. hardware. This particular package, which operates on DEC VAX equipment, fully automates all loan origination, document preparation and closing functions.

Sovran selected the Saddlebrook package from a field of five recommendations that were provided to the company by a consultant.

"We thought we had to run on IBM because everybody did," Nash says. "But when we went on-site to other mortgage companies and saw what they were doing with DEC and Saddlebrook, we realized we didn't have to."

Although it may be hard to believe, he adds, no one at Sovran had ever heard of DEC before the software selection study. "We knew IBM and had some Honeywell machines, but DEC was a new name to us," Nash admits.

A paper chase

The mortgage lending process is extremely labor intensive. Each mortgage may require a dozen separate documents, many legally mandated and all time sensitive.

These documents include bank deposit verifications, employment letters, credit references, good-faith estimates and appraisal reports. With System M, documents are updated, tracked and printed automatically. In fact, everything is automated — except the applicant's signature.

Before installing System M, keeping track of these forms was more hit-and-miss than systematic. Sovran's loan officers and the loan processors who work for them sat behind desks piled high with loan applications in various stages of completion, embellished with scraps of paper and penciled notes.

When loan processors were not filling out applications, they were on the telephone, making calls to gather facts for management, branch and secondary marketing reports. With 50 branches scattered across seven Mid-Atlantic and Southeastern states, this research made for hefty long-distance telephone bills.

The data collected by telephone was subsequently run through an IBM mainframe located in the Norfolk, Va., home office of Sovran's parent company, Sovran Financial Corp. By the time all the information was amassed, transferred to punch cards and reports produced, a month or more had passed.

"The information was very old, very stale and pretty worthless by then," Nash says.

With System M, "The information is received in Richmond on a much more timely and cost-effective basis," Nash says.

Branches are connected by a distributed network of DEC PDP-11/73s, 11/83s and 11/84s.

Six regional nodes tie the closest branches together and connect all of them to Richmond's host 11/84. For example, an 11/83 with an RA-81 disk drive connects Sovran's Saverna, Md., office with four other suburban Maryland branches.

In addition, each node is autodialed from the host in Richmond beginning at 2 a.m. each day. A time and date stamp appears on every report.

By the end of this year, Nash says, a dial-in daily mortgage-rate posting service will also be in place.

Since many of the loan processors are computer novices and inexperienced with the system, Nash says, the institution elected not to use personal computers. Instead, each processor types on an ITT Qume workstation. "Using DEC's distributed network," Nash says, "we didn't need to run data lines to the IBM in Norfolk or establish a local-area network of personal computers within our branches."

System M has proven to be so easy to learn that Nash fears many loan processors, who are hired right out of school, will not understand some of the basics of the mortgage business. He makes sure, therefore, that every new hire works alongside a veteran for at least two months before they even log on to the system.

> "WE THOUGHT we had to run on IBM because everybody did. But when we went on-site to other mortgage companies and saw what they were doing . . . we realized we didn't have to.
>
> JOHN NASH
> SOVRAN MORTGAGE CORP.

Not a human replacement

System M also simplifies the underwriter's job. The program can analyze loan-to-value ratios and debt-to-income ratios in seconds. Nash is careful, however, to say the software is only a tool and not a replacement for the underwriter. "The numbers can assist in making a decision, but there are many human factors that also have to be taken into account," he says.

Sovran added two custom modules to the basic System M package. One module tracks loan officers' performance to determine their commissions. The other module tracks the status of a loan applicant's bank accounts, even if the applicant maintains a dozen separate accounts in three completely different banking locations.

"Our ultimate goal is for loan processors to never write anything by hand," Nash says. "It's a matter of education and changing the way loans are processed. Relying on printed forms is the old way of doing things."

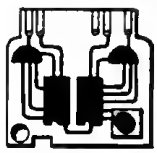
DEBORAH COOPER

Loan activity *at Sovran Mortgage Corp.*

Stacking the chips with VMS

Manufacturing flawless integrated circuits is an ideal that is difficult to achieve.

"You want to ship perfect parts, but the parts are so complex that it's not easy to tell whether there are any defects," says John Andrews, computer-aided design (CAD) staff engineer at Fairchild Semiconductor Corp.'s Digital and Analog Unit in South Portland, Maine, which fabricates bipolar and CMOS chips.



Because there are literally millions of things that can go wrong in the process, a flawless chip is something of a wonder. "I've been in this business a quarter of a century," Andrews says, "and I still think it's magic."

These days, a lot of the magic Fairchild achieves at this, its largest, division is attributable to a variety of third-party software designed specifically for integrated-circuit production and use on Digital Equipment Corp. computers.

> "I'VE been in this business a quarter of a century, and I still think it [a flawless chip] is magic."
>
> JOHN ANDREWS
> FAIRCHILD
> SEMICONDUCTOR CORP.

Double control on quality

After the chips are put through a rigorous gauntlet of hardware testing, Andrews uses a circuit simulation package, Logical Automated Stimulus and Response (LASAR) from Teradyne, Inc. in Boston, to double-check the accuracy of the testing equipment.

LASAR runs on the full range of DEC VAXs under VMS and determines how accurate a company's equipment is in detecting bad chips.

Andrews says he converted to LASAR — which has been commercially available since 1979 — in 1986, after using a string of other packages. "We

needed a better tool, and we made the switch last year," he says.

When the Fairchild division selects CAD software, one requirement is that it fits into the company's design environment, according to Andrews. That environment is heavily DEC oriented.

The Digital and Analog unit houses dozens of VAXs, including 8700s, 750s and Microvaxes. In addition, it uses CAD workstations from Mentor Graphics Corp. in Beaverton, Ore., that hook into the VAX network. "We have most of the VAX family," Andrews says. "VMS is the standard in integrated circuit design."

DEC-Teradyne alliance

In January 1986, DEC, which itself used LASAR during the design of its Vaxmate, signed a cooperative marketing agreement with Teradyne. The relationship between the two companies gained another facet in March this year when the firms signed a purchase agreement allowing DEC to use the package for design and test program verification in its mid-range computer and small-system operations.

LASAR, which sells for between $25,000 and $280,000, depending on the VAX used, models the behavior of good circuit simulation and stores the logical equivalents of physical defects.

All told, the Digital and Analog unit has purchased VMS software from more than 10 vendors of third-party CAD software.

Critical measures

Besides circuit simulation, Andrews uses VMS CAD software for applications such as mask layout verification. Photo masking, the generation of photograph-like negatives, is one step in the process of manufacturing integrated circuits. These masks must be checked to ensure the integrated circuit follows accepted layout rules.

One transistor may require 30 critical measurements; a chip may have 3 million mechanical dimensions. Any mistake is costly. Andrews compares the situation to putting undersized tires on an automobile. "Incorrectly sized parts push production costs up. It is crucial to ferret out errors," he says, adding that "it's not something humans can do."

Unlike other highly technical facilities, the Fairchild unit does not write its own applications, Andrews says. The cost of development and employee turnover are a few of the reasons the division shies away from homegrown software.

"Our philosophy is to buy, not write our own software," Andrews says. "We are the purchaser of the best software we can find." •

SUSAN GRECO

© CHARLES LADOUCEUR

Fairchild's John Andrews

ONE TRANSISTOR may require 30 critical measurements; a chip may possess 3 million mechanical dimensions. Any mistake will be costly.

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VENDOR VIEWPOINT
Luring likely developers with the right machine

BY YVONNE CEKEL

We are embarking on a new era in software engineering. Software systems are becoming more complex, more costly and more risky. This is especially true in the development of large, embedded systems such as avionics, communications and process control. The simpler days of code-and-go are gone, replaced by the concept of a complete software engineering environment.

It is my company's business to provide that kind of complete environment. Cadre Technologies, Inc. produces a family of structured tools for systems and software development, which go beyond basic programming tools, such as editors, compilers and debuggers, to automate the analysis and design stages that typically precede programming.

New tools like those in the Teamwork family require a more powerful environment for systems and software engineering. Structured development tools differ from programming tools in a variety of ways and, therefore, require a totally different development environment.

First, they have an interactive graphics-based user interface that is easy to learn and use. The interface is mouse-driven, offers pop-up and pull-down menus and provides the user with multiwindowing. These interactive features depend completely on local processing power for responsiveness and on bit-mapped displays for drawing graphics objects.

Digital Equipment Corp.'s Vaxstation 2000 represents the kind of workstation technology that tools like Cadre's demand, which is why we decided early to support the system and why we expect it to be a popular choice for software and systems developers.

The Vaxstation, with DEC's VAX Workstation Software graphics technology, delivers the power that structured development tools demand, and, what is even more important, it delivers the power locally.

The time-sharing configuration of terminals connected to minis, like DEC's VAX series, has dominated the software engineering environment. During the past several years, workstations have been adopted by several engineering disciplines, including computer-aided engineering for electronic design, mechanical computer-aided design for mechanical design and now, with the advent of low-cost monochrome workstations, computer-aided software engineering (CASE) for systems and software design.

Networking workstations

Today, time-sharing terminals are being replaced by workstations, such as the Vaxstation 2000, that have local processing power and the ability to display multiple windows of high-resolution graphics. These workstations network to server resources, such as a VAX, to create an effective software-engineering work group environment.

With this configuration, individuals get the power and graphics capabilities to support CASE tools, while the development group has access to powerful shared data base resources. Such an arrangement embodies the best of the workstation and time-sharing worlds.

Another example of today's class of development tools and an incentive for developers to work within the DEC environment is the company's own collection called VAX Software Engineering Tools (Vaxset). The module and configuration-management systems within Vaxset simplify version management, track code changes and reduce compilation time. As a result, these tools can help developers move products to the market more quickly.

As competitive and economic conditions intensify, more organizations will reevaluate how they develop systems. The Vaxstation 2000, along with new software engineering tools, delivers productivity benefits, not only to developers but also to the entire systems development team.

The new environment enables companies in the software and systems development industry to compete more effectively by lowering development costs, improving the quality of completed systems and shortening the time to market with new products or enhancements. •

Cekel is marketing manager of channel programs at Cadre Technologies, Inc. in Providence, R.I.

VENDOR VIEWPOINT
Healthy vendor alliances produce satisfied clients

BY FRANCES QUITTEL

Within the health care field, the necessity of implementing cost containment policies recently led to the development of alternative health care delivery systems and created new requirements for existing information systems within hospitals.

Within this changed environment, hardware companies have fairly quickly come to recognize the inroads made by end-user health care software companies in providing leading-edge solutions to meet these new business needs.

While hardware companies may be larger and possess more market staying power than most applications firms, the software companies are more dynamic, generating the need and the lead for hardware and total systems sales. They offer hardware vendors access to enhanced competitive positioning, sales and profits in new end-user markets.

Where one hardware vendor has uncovered fertile territory, others want to go. Consequently, a priority is to build relationships with software vendors that offer access to markets with the most potential. The nature of these relationships and how they are established and implemented is not always clear-cut, however, since interests of users are not served exclusively by one alliance.

By aligning itself with a successful software vendor, the hardware company obviously hopes to increase market share. Both sides must recognize, however, that end users currently tend to examine multiple options, and exclusivity on either side may not be what the end user wants.

In listening to clients, successful software firms hear: "We like your software. It is portable and upgradable. We want to make it part of our total solution to a current problem. We also want the option of having your application available on the machine we choose." That, of course, affects the hardware decision.

In seeking multiple hardware options, end users are most often motivated by two readily apparent factors: economics and a desire for simplicity. If an end user has already had a successful experience with a vendor, he wants to purchase what would best fit into, as well as leverage, what is already there.

Additionally, many start-up organizations in the health care field — including health maintenance organizations, preferred provider organizations, independent physician associations and multisite physician group practices — are experiencing tremendous growth. In such cases, hardware, as well as software, is clearly selected with an eye toward flexibility. Organizations want to buy packages that are easily portable and expandable without losing the investments already made.

Clearly, it behooves both sides to resolve joint marketing issues to address the concerns of both vendors and end users. When hardware and software vendors form working relationships, mutual success depends on several factors.

First, the software must offer a substantial end-user solution that is also perceived as worthy of investment by the hardware vendor. If the hardware vendor has a simple corporate organizational structure with which the software vendor can interact and can provide tools for the collaborative effort, positive results can occur more quickly. These efforts may range from having a specific organization dedicated to developing third-party alliances to being prepared to lend equipment and resources to the development effort.

Both parties also want to ensure that their joint solution is viewed favorably in the marketplace. Just being there is not enough. Hardware firms with a prior history of entering — and then leaving — specialized markets may now find themselves at a disadvantage. On the other hand, software firms must have sufficient development power. Commitment, energy and staying power are mutual vendor requirements.

Many factors come together to weave a complex fabric in forming and nurturing new strategic partnerships. How such arrangements develop and what fruit they bear will determine their evolution. In the interim, end-users are closer to seeing their needs better met. This can be expected to breed both satisfied clients and new sales •

Quittel develops and manages corporate partnerships for The Peabody Group, a San Francisco-based company specializing in health care systems.

DEC-compatible banking software

COMPANY	PRODUCT	DEC HARDWARE SUPPORTED	MEMORY REQUIRED (IN BYTES)	OPERATING SYSTEMS SUPPORTED	APPLICATIONS	TYPICAL USER	NUMBER OF STANDARD REPORT TYPES	CUSTOMIZED REPORTS AVAILABLE	GRAPHICS CAPABILITY AVAILABLE	SOFTWARE INTERFACES	OTHER HARDWARE SUPPORTED	PRICE
Automated Systems, Inc. (605) 335-3636	Automated Financial Control Systems	All VAXs, PDP-11	256K	RT11-TSX+, VAX/VMS	Demand deposit, savings, loans, certificate of deposit, customer information file, asset liability, report generator	Bank with less than $100 million in assets	Unltd	Yes	No	All ASCII-formatted word processors	None	$15,000-$30,000
Banker's Information Systems & Services, Inc. (713) 988-1272	Commercial Loan Ledger	Rainbow 100 100+	256K	MS-DOS, PC-DOS	Commercial loans	Accounts receivable department	15 to 20	No	No	Proprietary	IBM PC and compatibles	$2,995
	Fixed-Asset Accounting	Rainbow 100 100+	256K	MS-DOS, PC DOS	Fixed-asset accounting	Financial officer	10 to 15	No	No	Proprietary	IBM PC and compatibles	$1,095
	General Ledger	Rainbow 100, 100+	256K	MS-DOS, PC DOS	General ledger	Financial officer	Unltd	Yes	No	Proprietary	IBM PC and compatibles	$2,295
CDS Computer Corp. (818) 992-7557	**Mortgage-Backed Securities Processing System**	**All VAXs**	**9M**	**VAX/VMS**	**Payment collections for Ginnmae, Fannmae, Freddiemac**	**Large holder of mortgage-backed securities**	**20**	**Yes**	**Yes**	**Any banking securities accounting system**	**IBM MVS mainframes**	**From $90,000**
	REMIC/CMO System	**All VAXs**	**9M**	**VAX/VMS**	**Bond value calculation, tranche payments, investment income, calamity calculation, collateral collection**	**Trust officer, secondary marketing officer**	**25**	**Yes**	**Yes**	**Any banking securities accounting system**	**IBM MVS mainframes**	**From $300,000**
	Mortgage Inventory Custody	**All VAXs**	**9M**	**VAX/VMS**	**Control storage and retrieval of loans and related documents**	**Any large holder of mortgage-backed systems**	**12**	**Yes**	**No**	**Any banking loan servicing system**	**IBM MVS mainframes**	**From $60,000**
Cibar, Inc (413) 458-8072	Trade Service Processing System	All VAXs	4M	VAX/VMS	Trade services for wholesale inter national banking	Bank providing trade services	50+	Yes	No	Swift other banking applications	None	$20,000-$800,000
Citicorp Information Resources (203) 625-7500	**Intelligent Bank Workstation**	**All VAXs**	**—**	**VAX/VMS**	**LISP-based expert system for converting unstructured Telex to Swift**	**International department**	**NA**	**No**	**No**	**Telex, payment and trade services systems**	**Lamda**	**From $150,000**
	Trade Services	**All VAXs**	**—**	**VAX/VMS**	**Letters of credit and collection**	**International department**	**50**	**Yes**	**No**	**Swift**	**Data General**	**$100,000-$300,000**
Computer Aided Decisions, Inc (617) 542-6181	Expanded Portfolio Valuation System	All VAXs	3M	VAX/VMS	Portfolio management research and trading	Portfolio manager	Unltd with Datatrieve	Yes	No	Downloads to Lotus	None	From $100,000
Control Data Cybercredit Financial Systems (314) 862-7700	Cybercredit II	All VAXs	2M	Ultrix	Delinquent loan collection and recovery	Loan collection and recovery department	12	Yes	Yes, optional	Ingres relational data base manager and IBM network protocols	None	$40,000-$160,000
Custom Computer Services, Inc (605) 343-7800	ABS Banking System	All VAXs PDP-11	256K	RT11-CTS300 VAX/VMS	Complete banking services	Bank with up to 200 million in assets	Unltd	Yes	No	Proprietary	AT&T, IBM, NCR Altos, any Unix System V	$20,000-$40,000
Interactive Technology Corp (404) 261-1264	IT Answers	Microvax II VAX 8000 series	9M	Ultrix 32M Ultrix 32	Corporate cash management	Cash management employee	5 to 20	Yes	No	None	Any supporting Berkeley Unix with C compiler	$100,000-$350,000
Intranet, Inc (617) 782-4337	Intranet	All VAXs	3M	VAX/VMS, MicroVMS	Commercial and accounting functions for banking funds transfer	Wire transfer department of bank	50+	Yes	No	IBM mainframes over SNA Gateway, any financial communications network	None	From $150,000
Logica Systems, Inc. (212) 599-0828	Fastwire	All VAXs, PDPs	6M	VAX/VMS, MicroVMS, RSX-11	Wire room communications for domestic and inter national banks	Telecommunications and funds transfer department	Unltd.	Yes	No	None	None	Contact vendor
Manufacturers Hanover Financial Management Systems (800) MHT-PLEX	Interplex	MicroPDP 11/23 to 11/83	2M	RSX 11M+	Treasury management system	Money desk manager	60	Yes	No	MS-DOS, PC DOS	IBM PC and compatibles	$30,000-$80,000
McCue Systems, Inc (415) 348-0650	Leasepak	All VAXs	0.5M	VAX/VMS	Full lease accounting	Loan, lease and commercial lending personnel	50 to 100	Yes	No	20/20, Compushare general ledger packages	None	From $40,000
	Bankpak	All VAXs	0.5M	VAX/VMS	Asset-based lending and revolving loan	Commercial lending department in a major bank, financial service industry	30 to 50	Yes	No	20/20	None	From $30,000
McDonnell Douglas Financial Services International (201) 460-1450	International Banking & Investment Systems	All VAXs	4M	VAX/VMS	Wholesale banking	Any bank wholesale or treasury department	Unltd	Yes	Yes	Transcom general ledger, Swift Montran, any mainframe package	None	From $100,000
Mini-Micro Business Systems Corp (800) 628-2828 ext. 278	Banking series	All DEC	512K	VAX/VMS, MicroVMS, Unix, Xenix, Concurrent DOS, RSX 11, RSTS	Construction, mortgage, commercial and consumer lending, property management, loan tracking and origination, general ledger	Any financial institution	40	Yes	Yes	MS-DOS, PC-DOS, 1-2-3, Dbase	IBM PC, XT, AT, PC Tower/386 Tower series, IBM PS/2 (all models)	$2,995-$100,000
Money Management Systems, Inc (617) 890-2070	Moneymarket II	All VAXs	4M	VAX/VMS	Fixed-income securities processing system	Trading and portfolio manager, treasury department	100+	Yes	No	Focus Report Writer, any bank demand-deposit or general ledger system	None	Contact vendor

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Further product information is available from vendors.

COMPANY	PRODUCT	DEC HARDWARE SUPPORTED	MEMORY REQUIRED (IN BYTES)	OPERATING SYSTEMS SUPPORTED	APPLICATIONS	TYPICAL USER	NUMBER OF STANDARD REPORT TYPES	CUSTOMIZED REPORTS AVAILABLE	GRAPHICS CAPABILITY AVAILABLE	SOFTWARE INTERFACES	OTHER HARDWARE SUPPORTED	PRICE
The Montran Corp. (212) 344-9300	Money Transfer System	All DEC	Hardware dependent	VAX/VMS	Money transfer	International or American bank handling international transactions	NA	Yes	No	Chips, Swift, other proprietary	None	$20,000-$750,000
	Back-Office System	All DEC	Hardware dependent	VAX/VMS	Demand deposit general ledger foreign exchange, loans, letters of credit	International bank	Unltd.	Yes	No	Other proprietary networks	None	$20,000-$750,000
National Computer Systems (404) 641-4100	Trustware	All VAXs Microvax PDP 11	Terminal and subsystem dependent	VAX/VMS MicroVMS RSTS	Financial asset management	Trust officer lawyer broker insurance executive	Unlimited	Yes	No	Proprietary DEC MS-DOS PC DOS	IBM PC AT Texas Instrument systems	From $10,000
Pegasystems, Inc. (617) 576-3580	Pegaclaims	Microvax to 8700, including clusters	8M	VAX/VMS	Customer service automation and acceptance resolution	Centralized customer service center for customer complaints or back-office exceptions	70	Yes	Yes	Any bank accounting funds transfer or transaction processing system	IBM CICS mainframes	Contact vendor
Precision Business Systems, Ltd. (212) 425-0200	Security Clearance System	All VAXs	4M	VAX/VMS	Government security clearance	Large banking institution	20	Yes	No	Proprietary	None	Contact vendor
	GMX	All VAXs	4M	VAX/VMS	Front-end communications switch interfacing to Fedwire Chips and Swift network	Funds transfer applications officer	Unlimited	Yes	No	Any funds transfer application system	None	Contact vendor
	Qualitran	All VAXs	4M	VAX/VMS	Retrieval subsystem for payment qualification	Funds transfer applications officer	NA	Yes	No	Any customer information file	None	Contact vendor
Ramstar Corp. (415) 362-1525	Ramstar T-1500 MICR Printer Systems	Microvax, PDP-11/23 to 11/53	256K	RSX-11	Bank depository and preauthorized transfer checks, other magnetic ink character-recognition documents	Cash management services	NA	NA	No	None	Dataproducts printers	$146,400
Resort Computer (303) 232-9417	Notes Receivable Management	All VAXs PDP 11	512K	VAX/VMS RSTS/E	Mortgage notes receivable collections management	Mortgage office	12	No	No	Proprietary	IBM PC and compatibles	$7,500 $15,500
Saddlebrook Corp. (617) 661-8100	Financial Planning & Control System	PDP-11	512K	RSTS	General ledger, financial management and reporting	Thrift institution employee	100	Yes	No	Proprietary	None	Contact vendor
	System M	PDP-11	512K	RSTS/E	Mortgage loan origination and secondary marketing	Mortgage loan officer	100	Yes	No	Proprietary	None	Contact vendor
	Saddlebrook Advanced System	All VAXs	8M	VAX/VMS	Customer account processing and integrated information processor	Front-office banking personnel	User defined	Yes	No	DEC WPS	None	Contact vendor
Sanchez Computer Associates (215) 296-8677	Profile	All VAXs	16M	VAX/VMS	Integrated banking system	Savings loans and commercial bank with greater than $100 million in assets	100+	Yes	No	All CSV formats	None	Contact vendor
Savings Banks Trust Co., Integrated Systems Products (516) 496-6755	Proserv	All VAXs	4M	VAX/VMS	Total banking package	Savings and loans bank	User defined	Yes	No	Proprietary	None	Contact vendor
Springfield Computer Consultants, Inc. (417) 881-5057	Access Banking System	All VAXs, PDPs	1M	VAX/VMS MicroVMS RSTS	All banking functions	Bank with less than $200 million in assets	Unlimited	Yes	No	Proprietary	None	Contact vendor
	Loans in Process Calculator	All VAXs PDPs	1M	VAX/VMS MicroVMS RSTS	Loan calculations and contract generator	Loan officer	10	No	No	Proprietary	None	Contact vendor
	Signature Verification System	All VAXs, PDPs	1M	VAX/VMS MicroVMS RSTS	On-line signature verification	Customer service representative	0	No	Yes	Proprietary	None	Contact vendor
Technica, Inc. (609) 987-2400	Apex	All VAXs	2M+	VAX/VMS	Consumer credit applications	Credit grantor	6	Yes	No	Lotus, any mainframe software	IBM PC Network	From $150,000
Ultradata Corp. (415) 463-8321	Ultrafis	All VAXs LSI-11	—	Pick	Financial and administrative system loans deposits general ledger, ATMs	Community bank or credit union	300 to 400+	Yes	Yes	Other Pick-based packages	Honeywell DPS-6 series IBM 9370 4300 & 3000 series	From $100,000
Winter Partners Information & Technology, Inc. (212) 682-9410	RIBS	All DEC	1M	VAX/VMS, RSTS/E	Full banking system including demand deposit, loans, general ledger letters of credit	Investment management department	100+	Yes	No	With customization	None	$100,000-$500,000
Yardley Group, Inc. (215) 794-3513	FS-II	All VAXs	2M	VAX/VMS	Back-office system for trading futures and options	Treasury department	100+	Yes limited	No	With customization	IBM PC and compatibles	From $25,000

Selected DEC-compatible aerospace software vendors

BBN Software Products Corp.
(617) 864-1780

Dataprobe
An interactive time-series analysis and graphics system for use in data analysis including telemetry and recording systems, wind tunnel tests, computer simulations, atmospheric testing; vehicle crash tests, range testing of aircraft, missiles and torpedoes, and biological and physiological recordings.
Price $30,000 - $65,000

Breault Research Organization, Inc.
(602) 795-7885

Apart/Pade Stray Light Analysis Program
Handles most asymmetrical optical systems, including those with off-axis optical surfaces, folding flats and deviating prisms
Price $2,500 - $60,000 (per month)

Computer Software Management and Information Center of NASA (Cosmic)
(404) 542-3265

The Simple Tool for Automated Reasoning (STAR)
An interactive, interpreted programming language for the development and operation of artificial intelligence application systems
Price $2,000 (for DEC VAX series)

Mini Video Image Communication and Retrieval System/Image-Based Information System (VICAR/IBIS)
Provides the minicomputer user with basic general-purpose image processing and manipulation capabilities, as well as an information management system for accepting, converting and operating on vector (graphical) and tabular data
Price $2,500

NASA Structural Analysis System (Nastran)
A program for the analysis of structures by the displacement method of the finite-element approach
Price $7,000 (for DEC VAX license)

Engineering Analysis Corp.
(213) 530-3273

Ease
A large-scale, linear static and dynamic finite-element structural analysis system. Operates on virtually any 32-bit and larger computer system. Current release is Level 13.4
Price $4,000 - $6,500 (per annual lease)

H. G. Engineering
(416) 447-5535

ASAS
ASAS is a finite-element program providing solutions for linear static analysis. Offers virtually unlimited job-size capacity, evaluation of natural frequencies and mode shapes and transient and steady-state heat conduction calculations
Price $7,200 (per annual lease)

Lockheed Palo Alto Research Laboratories
(415) 424-3237

Structural Analysis of General Shells
For the practical engineering analysis of thin shells, including axial and torsional springs and general nonlinear beam elements. Options included for linear and nonlinear stress analysis, bifurcation buckling, nonlinear collapse analysis, vibrations and transient response analysis
Price $5,000

Buckling of Shells and Revolution (BOSAR 4)
Performs stress, stability and modal vibration analysis of complex branched shells of revolution made of elastic material. Also is able to handle prismatic shells and panels
Price $1,000

Panel Design and Analysis (Panda)
Interactive program for minimum weight design of composite, elastic plastic, stiffened, cylindrical or flat panels
Price $1,000

The Macneal-Schwendler Corp.
(213) 258-9111

MSC/Nastran
A large-scale analysis program that utilizes the finite-element method. Capabilities include static and dynamic structural analysis, material and geometric nonlinearity, heat transfer, aeroelasticity, acoustics, electromagnetism and other types of field problems
Price Contact vendor

Mitchell & Gauthier Associates, Inc.
(617) 369-5115

Advanced Continuous Simulation Language
Enables engineers and scientists to effectively model the dynamic response of physical systems
Price $8,000 - $14,500 (for DEC VAX license)

Pro-Matlab
An interactive program that serves as a convenient laboratory for computations involving matrices and signals.
Price $6,500 - $28,900 (for DEC VAX license)

Scigraph
A presentation-quality statistical graphics package with complete menus and fill-in-the-blank forms.
Price $2,995 - $15,000 (for DEC VAX license)

Milstress
An Electronic Reliability Prediction model based on the U.S. Dept. of Defense Mil-HDBK-217
Price Contact vendor

Pritsker and Associates, Inc.
(800) 428-7636

Tess
A simulation support system integrating all activities associated with simulation projects, including graphic model building, data management and analysis and comparison of alternate scenarios. Displays simulation results graphically
Price Contact vendor

Slam II
Simulation language designed for comparison of alternative designs. Serves as modeling tool for planning and control of operations.
Price Contact vendor

Slam II/PC Animation System
A subset of Tess concepts ported to the PC environment. Allows the Slam II user to develop and display animations of the simulation models and display results on interactive data graphs.

Structural Research and Analysis Corp.
(213) 452-2158

Cosmos/M
A general-purpose finite-element analysis program including stress, vibration, buckling and transient linear and nonlinear dynamics. Also includes heat-transfer analysis, gap, composite, sandwich and orthotropic materials. Color solid-modeling graphics, shading and animation
Price From $6,000

Synergistic Technology, Inc.
(408) 253-0752

Vibration, Acoustic and Modal Processor
A general-purpose time-series, spectrum-analysis and modal-analysis program. More than 100 commands, including arithmetic operations, digital filtering and signal analysis
Price Contact vendor

Tektronics CAE Systems, Inc.
(512) 331-1303

Designers Data Base Schematic Capture
Serves as a software nucleus for a complete circuit design system. A user-customizable, menu-driven system for design capture of integrated circuits and printed-circuit board schematics.

Selected DEC-compatible electronics software vendors

AB Associates, Inc.
(813) 932-9853

I-G Spice
An interactive graphics version of the Spice II program. Includes AC, DC and transient analysis, nonlinear magnetics, discrete, integrated circuit and Fortran-based model libraries and documentation
Price Contact vendor

Applicon (a division of Schlumberger Ltd.)
(408) 438-2880

Design Capture
A graphical schematics capture program supporting hierarchical design of complex circuits. Employs advanced human interface features such as matching menus
Price Contact vendor

Bravo 3 PCB
For design of advanced printed-wiring boards integrated with mechanical design of packaging or enclosures. Allows the designer to create solid or wire-frame models of his printed-wiring boards
Price Contact vendor

Bravo 3 VLSI
A state-of-the-art knowledge-based very large-scale systems integration editor using artificial intelligence techniques to speed the process of cell design.
Price Contact vendor

BBN Software Products Corp.
(617) 864-1780

RS/1
A fully integrated data analysis software system that combines statistical, graphical, curve-fitting, modeling and report-generating functions with a powerful programming language
Price $3,900 - $79,000

Cadmatics
(818) 884-8957

Symbolic Drawing Machine
A symbolic editor for electronic circuit schematics, software flowcharts, data flow diagrams, data base structures, test flow and configuration diagrams and other complex symbolic drawings
Price $2,500 (per workstation)

Logic Design Automation Terminal
Combines net and parts lists generated by Symbolic Drawing Machine/CLS schematic editor and compiler or hand-coded text files with geometry and integrated-circuit parametric data to produce a complete DC loading check and correctness analysis, sorted build documents and a computer-supported wire-wrap prototype
Price $500 (per month)

Case Technology, Inc.
(415) 962-1440

Case/Cadat Simulation Technology
Includes logic simulation, fault simulation, timing analysis and hardware modeling. The Cadat series of simulation tools works with the Case Vanguard CAE Design System to develop digital circuit design
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Vanguard PCB Design System
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Price $900 - $30,000

ECAD, Inc.
(408)727-0264

Dracula III
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Electrical Engineering Software, Inc.
(800) 992-6505, (800) 367-3374 in California

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Price Contact vendor

PCK Technology Division
(516) 454-4466

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Topex
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Supra
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Tektronix CAE Systems, Inc.
(512) 331-1303

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Selected DEC-compatible health care software vendors

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Transaction processing systems for health maintenance organizations, preferred provider organizations and other prepaid health plans.
Price: Contact vendor

Transact Clinic
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Price: Contact vendor

PRX, Inc./MEDRX Medical Systems
(617) 369-3566

MEDRX Medical Systems
A complete system for management of patient and insurance billing and tracking, medical records, appointment scheduling, word processing and report generators.
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SDK HIS
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Share Medical Systems (SMS)
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Spirit Choice
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IBM's 9370: Worth the fanfare?

Compatibility and easy installation make the 'superminimainframe' instantly useful

BY E. PAYSON HALL III

Last October, IBM announced an addition to its 370 computer family. Dubbing the line the "9370," IBM placed a three-page ad in *The Wall Street Journal* proclaiming the arrival of the "superminimainframe."

Executives nationwide were introduced to a system with vague performance specifications that could not be delivered until the second half of this year. The tone was reminiscent of Apple Computer, Inc.'s sensational Macintosh campaign, the implied theme here being "the mid-range computing system for the rest of us."

When the band had played its last march and the confetti was swept away, decision makers went home wondering what had just happened. Industry analysts divided into two camps: those tentatively assessing the situation, hoping for some real information, and those saying, "IBM doesn't know this market and is going to discover that it can't expect to dominate it like it does large mainframes." Old-timers may remember similar statements about the IBM Personal Computer just after its introduction in 1981.

ILLUSTRATION BY TOM TAILCOTT

What is the 9370?

Marketing aside, what solutions does the 9370 offer? Where does it fit into a three-year DP plan?

The 9370 information system currently consists of a family of four 370 architecture information processors: the 9373 Model 20 for the low end, the 9375 Models 40 and 60 for the low-middle and high-middle ranges and the 9377 Model 90, a high-end machine. Five factors make the 9370 family worthy of note:

- Because they are 370-compatible, the 9370 machines will run existing 370 software under popular operating systems like VM/SP, DOS/VSE, MVS and VM/IX, IBM's version of Unix. This capability means that no conversion of applications or personnel retraining should be necessary to migrate from an existing 370 mainframe to a 9370 family member.
- Using the technological advances of the past few years, 9370s are amazingly compact systems. The baby of the family, the Model 20, fits 16M bytes of memory, a floating-point accelerator, 700M bytes of disk capacity and a single tape drive into a cabinet roughly the size of a small washing machine.
- The 9370 machines use regular, or single-phase, 220V electricity, do not require a raised floor or exceptional air-conditioning and are quiet enough for an office environment.
- The hardware is inexpensive — for a 370 architecture processor — and IBM's new tiered software-pricing strategy offers systems software at a correspondingly low cost, resulting in complete systems at competitive prices.
- The hardware — and the software most likely to accompany it — is designed and packaged for installation by nontechnical and semitechnical users rather than a cadre of technical experts. IBM has announced several packaged collections of software intended to provide turnkey configurations for different applications. The hardware is engineered to allow IBM to provide remote systems programming support for problem resolution, allowing even microcode modifications to be made via remote access.

In the 9370, users are offered an inexpensive 370 system that can come out of the large, expensive, refrigerated and specially wired computer room and sit out in the open, next to the office watercooler.

A shot in the arm

What does the 9370 do for existing 370 users? It does two things: First, because the 9370 is more cost-effective than the current low- to mid-range 370 mainframes, it gives a shot in the arm to the 370 processor line. Second, the 9370 provides a consistent vehicle for delivery of distributed processing and networking to users who already use IBM in their corporate data centers.

The 9370 proves to be a cost-effective replacement for a great deal of existing IBM hardware. With a typical entry-level system — a 9373 Model 20 with 4M bytes of memory, a 736M-byte

Hall is a senior consultant in the Management Consulting Services Group of Price Waterhouse in Sacramento, Calif.

• More off-the-shelf software than Apple II

• MIS managers' tie-in to PCs and LANs

• But should non-370 users feel tempted?

direct-access storage device (DASD) and one tape drive — costing about $80,000 and packing more punch than a similarly configured 4361 Model 3 at $110,000, current 4300 series users will reconsider their leases carefully the next time they run out of steam or space in the computer room.

Do not let the small physical size fool you. On the high end, the 9377 Model 90 performs somewhere in the low 4380 range, again at a significant price advantage — for an 8M-byte system running 2.5 million instructions per second (MIPS), roughly $70,000 per MIPS compared with nearly $170,000 per MIPS for an 8M-byte, 1.3 MIPS 4381 Model 11. The 9370 could become the 370 system of choice on price/performance merit alone.

But what about those networking, departmental computing and distributed processing concerns? For existing 370 installations, the 9370 legitimizes departmental processing for IBM. Digital Equipment Corp users who have been doing departmental processing for several years may wonder what was illegitimate about departmental computing until now, but, unlike IBM, most of them seem to be unconcerned with supporting systems written five to 15 years ago.

The 9370 seems to be a cost-effective way to distribute existing applications. The flexibility to place processing power where it is needed is an attractive alternative to trying to tune a large production system to meet the strict response-time requirements of small groups of users with specialized needs. Some of those nasty high-priority CICS transactions may now be split out of larger batch systems and put on a departmental processor near the users. Links to central data centers and other departmental processors could provide cross-domain access to applications used less frequently.

The backdoor approach

In a speech several years ago, retired Rear Admiral Grace Murray Hopper suggested distributed processing was going to be the solution to performance problems when the computer industry could no longer double computing capacity every few years. Most of us nodded our heads and bought a bigger mainframe. Academia conducted distributed systems research; IBM built dyadic processors.

With the advent of the personal computer and its proliferation throughout nearly all business operations, DP backed into distributed processing, in most cases without the benefit of a plan. This lack of planning has resulted in severe integration problems in many organizations and ultimately in the failure to fully achieve the potential benefits of distribution.

The 9370 provides a reasonable vehicle for integrating all those individual PCs and PC local-area networks (LAN) into the corporate DP environment — a bridge between individual PC users and the corporate data they require to get their work done.

The 9370 processors are connected to all peripherals through I/O controller cards that plug into slots in the processor's chassis. These I/O controller cards determine the devices and communications protocols the 9370 will support. The more powerful 9370s allow more slots for I/O controller cards. I/O controller cards provide such things as the following:

- Block multiplexer channels for the ability to attach standard 370 devices.
- Communication subsystem controllers, including support for ASCII devices, Ethernet, Telecommunications Controller and IBM's Token-Ring network.
- Workstation controllers, each supporting connections of up to 32 3270 devices.
- DASD/tape I/O controller, which supports up to four 9335 DASDs, one 9347 tape drive or up to four 9332 DASDs with one 9347 tape drive.

This configuration flexibility makes the 9370 compatible with a wide range of existing IBM and OEM hardware — an acknowledgement of the growing connectivity pressures from industry customers. The ability to select which I/O controllers are relevant and to easily add more as needed makes the 9370

adaptable to a range of needs.

The availability of support for both Ethernet and standard ASCII connectivity suggests a move toward incorporating — rather than ignoring — existing peripheral equipment. The VM system usually accompanying the 9370 provides a transitional environment congruent to the PC world with which users are already familiar, giving them a gentle way to access mainstream corporate data in the IBM world without feeling lost in the complexities of a mainframe.

Will non-370 users bite?

For organizations that are not currently 370 users, the 9370 announcement is still significant. While researchers were perfecting ideal architectures capable of carrying computing into the 1990s, practicing computer professionals were compelled to build real systems with what was available.

Because many 370 systems have been installed worldwide, many solutions were implemented in that environment. As a hardware vehicle for delivering software solutions, the 9370 is immediately prepared to support more solutions than any other processor in its class.

If you are not a current 370 user, your major question might be, "Will the problems I have to solve best be addressed on a 370 system?" Although compatibility of the implemented solutions is an issue, it must be evaluated in the context of the problem at hand. For example, if a user employs DEC equipment for real-time process control on a widget factory shop floor but requires a widget-specific order entry system available only in a 370 environment, it might be more cost-effective to purchase a 9370 than to develop a similar system for DEC equipment.

Compatibility is still a relevant issue. One of the factors that historically makes breaking into traditional IBM markets so difficult for other vendors is DP's desire for consistency among systems. Ironically, this factor may prove to be a hurdle for IBM as it tries to place its 9370 system with customers who currently have in place homogenous non-370 systems, including IBM's own System/36 and 38.

IF YOU are not a current 370 user, your major question might be, "Will the problems I have to solve best be addressed on a 370 system?"

If an organization does not own any mainframes or minicomputers but is evaluating its options, the 9370 is simply another device on the market. It is not so superior that it should be selected without exploring the alternatives, but it is an option worthy of consideration.

The real difference

Processor speed is historically the biggest factor used to differentiate among compatible processors, although reducing performance analysis to comparison of MIPS ratings can be misleading. Looking at the 9370 processor line, the processor speed of the Model 40 is equivalent to the Model 20 for most applications.

The Model 40 additionally uses a high-performance floating-point facility and hardware implementation of multiplication, division and square root functions. If you plan to run engineering or scientific applications on the 9370, expect the Model 40 to outperform the Model 20. For business purposes, however, the processors themselves offer about the same speed.

When processor speed is truly the limiting factor in the performance equation, users can simply purchase a larger processor or distribute the work load among multiple processors. On the high end, Models 60 and 90 both offer additional features that streamline storage access and implement frequently used operations directly in the hardware. A field-upgrade migration path exists from the Model 40 through the Model 90 allowing the processor to grow with a minimum of disruptions as the work load expands.

Frequently, processor speed is not the limiting factor in a slow system. In a number of business

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Sample 9370 configurations

Compared with the Model 40, the Model 20 configuration seems like a less expensive way to get the same capacity, but it is almost overloaded already. The Model 20 may be better suited to the lighter duty Profs configuration below.

IBM 9373 Model 20 solution		Price (in thousands)
1	9373 Model 20 (8M-byte memory)	$41
2	DASD/Tape subsystem controllers	6
2	9309 racks (total of 1.6 meters tall)	6
6	9332 DASDs (2.2 G-byte total)	84
2	9347 tape devices	16
1	Workstation controller (capacity of 32 devices)	4
Total price		$157

IBM 9375 Model 40 solution		Price (in thousands)
1	9375 Model 40 (8M-byte memory)	$65
3	DASD/Tape subsystem controllers	9
2	9309 racks (total of 1.6 meters tall)	6
1	9335 DASD controller	8
3	9335-B01 DASDs (2.4 G-byte total)	64
2	9347 tape devices	16
1	Workstation controller (capacity of 32 devices)	4
Total price		$172

IBM 9373 Model 20 supporting Profs		Price (in thousands)
1	[illegible]	[illegible]
1	DASD/Tape subsystem controller	3
1	[illegible]	3
2	9332 DASDs (1.7 G-byte total)	28
1	[illegible]	8
1	Workstation controller (capacity of 64 devices)	6
Total price		$61

CW CHART

applications, a processor is often waiting for I/O operations to finish. The ability to support high I/O volume is something to watch carefully in any proposed 9370 system. The low-end Model 20 offers a single internal bus that can support up to four I/O controllers. Models 40 and 60 can support up to four internal buses, thereby supporting up to 16 I/O controllers. Model 90 supports up to six buses, with a maximum of 16 controllers. For I/O-intensive applications, I/O controller selection and balance among buses may be far more important than processor speed.

There are system software differences among the processors that are relevant. The two entry-level models, Models 20 and 40, fall into the lowest tier of IBM's new software pricing strategy. This means that system software and applications cost about half as much to run on a Model 40 as they would to run on a Model 60 or 90. Although both of the low-end processors come standard with VM microcode performance assists, neither will support MVS. Both of the high-end Models 60 and 90 come standard with both VM and MVS microcode performance assist hardware.

Price options

Since price/performance is a crucial feature of the 9370, a look at a few real numbers for a few simple systems will give an idea of what they look like. For example, suppose you run a small, basically equipped VM software development organization. You decide that 2.2G bytes of DASD — equivalent to about seven 3350s or one 3380 — and two tape drives will be adequate.

In a solution using the 9373 Model 20, note that the six 9332 DASD are slower and more expensive than the Model 40's single 9335-A01 controller and three 9335-B01 DASDs — 2.4G bytes for about $72,000 (see chart at left). But the string of 9335 DASD controllers cannot be supported on the Model 20 processor concurrently with two 9347 tape devices because the Model 20 will only support two DASD/tape controllers.

Although a DASD/tape controller will support both a 9347 tape device and up to four 9332 DASDs at the same time, it will support either one 9347 or a string of 9335 DASDs. Two tape drives and a string of 9335 would therefore require a total of three DASD/tape controllers, which exceeds the stated capacity of the Model 20. Note also that in the Model 20 configuration above, all I/O occurs on the same internal bus, which may adversely affect performance.

In a configuration intended to meet the same need but implemented on a 9375 Model 40 (see chart at left), the difference between the two systems is more than 200M bytes of disk storage and $15,000 when the evolution potential of each is examined. The Model 20 is two 9332 units away from maximum disk capacity, which is another 0.7G bytes. It can support no additional tape devices; it can support one additional I/O subsystem controller. Two incremental 4M-byte memory upgrades are available. In short, the Model 20 is very near its maximum device capacity; additionally, it is the only unit in the 9370 line that is not field-upgradable to a more powerful model.

The Model 40 system described does not yet approach device capacity. The single 9335-B01, which could be supported by the A01 unit that is already a part of the configuration, provides an additional 0.8G bytes. In addition, the Model 40 will support another DASD/tape subsystem controller, allowing either an application tape unit or another complete string of 9335, providing another 3.1G bytes. This configuration will support up to 12 additional I/O controllers in all, allowing far more evolutionary flexibility. The Model 40 processor can be field-upgraded to either a Model 60 or a Model 90 as needed. Additional memory is available in a single 8M-byte package.

How do the Model 20 and 40 compare? Both fit, with room to spare, into two 9079 racks. Both met the requirements outlined for the scenario described above.

While the Model 20 and 40 processors offer essentially the same speed for applications not requiring enhanced floating-point hardware, when choosing between the two, an eye toward system growth is critical. Keeping in mind that to install the Model 60, the Model 20 must be completely replaced, if we assume the ability to fully apply the value of our 8M-byte Model 20 ($41,000) toward an 8M-byte Model 60 ($93,000), it will cost $52,000 to buy two or three times the processing power. If we assume that upgrading the Model 40 to a Model 60 will cost only the difference in price between the models, this increased processing power is available at an incremental cost of only $28,000.

Alive and well

One early analysis of the 9370 announcement suggested the Model 20 was "dead on arrival." While this may not be strictly true for small systems with limited expected growth, in the scenario described it would be difficult to recommend the Model 20 solution in preference to that of the more flexible Model 40.

Let's look at a smaller system using IBM's Professional Office System (Profs), in which the Model 20 might make more sense (see chart at left). This configuration could support 60 active Profs workstations and still be contained in a small unit.

The system software required — VM, RCSC and Profs — would add about $24,000 to the purchase price, resulting in a system that could make Profs available to 60 users for an initial cost of about $105,000. This pricing makes the Model 20 an attractive delivery medium for applications such as office automation that are capable of running in a loosely coupled network rather than requiring a monolithic processing environment.

If another department decided to participate in the Profs network, an alternative to upgrading would be to place another Model 20 in the new department and link the systems, depending on geographical separation, cost center considerations, resale values and other factors. If there is a niche for the Model 20, it is as a small distributed VM system.

Power in a small package

The 9375 Model 60 offers better price/performance than either of the two smaller models. It also compares favorably with the 4361. Consider, for example, a 4361 Model 5 processor with one channel and 8M bytes of storage for example. IBM lists the 4361 Model 5 — about 1.2 MIPS — for roughly $150,000. A Model 60 with 8M bytes and a single channel, also about 1.2 MIPS, is listed at $100,000.

Comparing the peripherals that are available for the 9375 with those available for the 4361 reveals the following interesting

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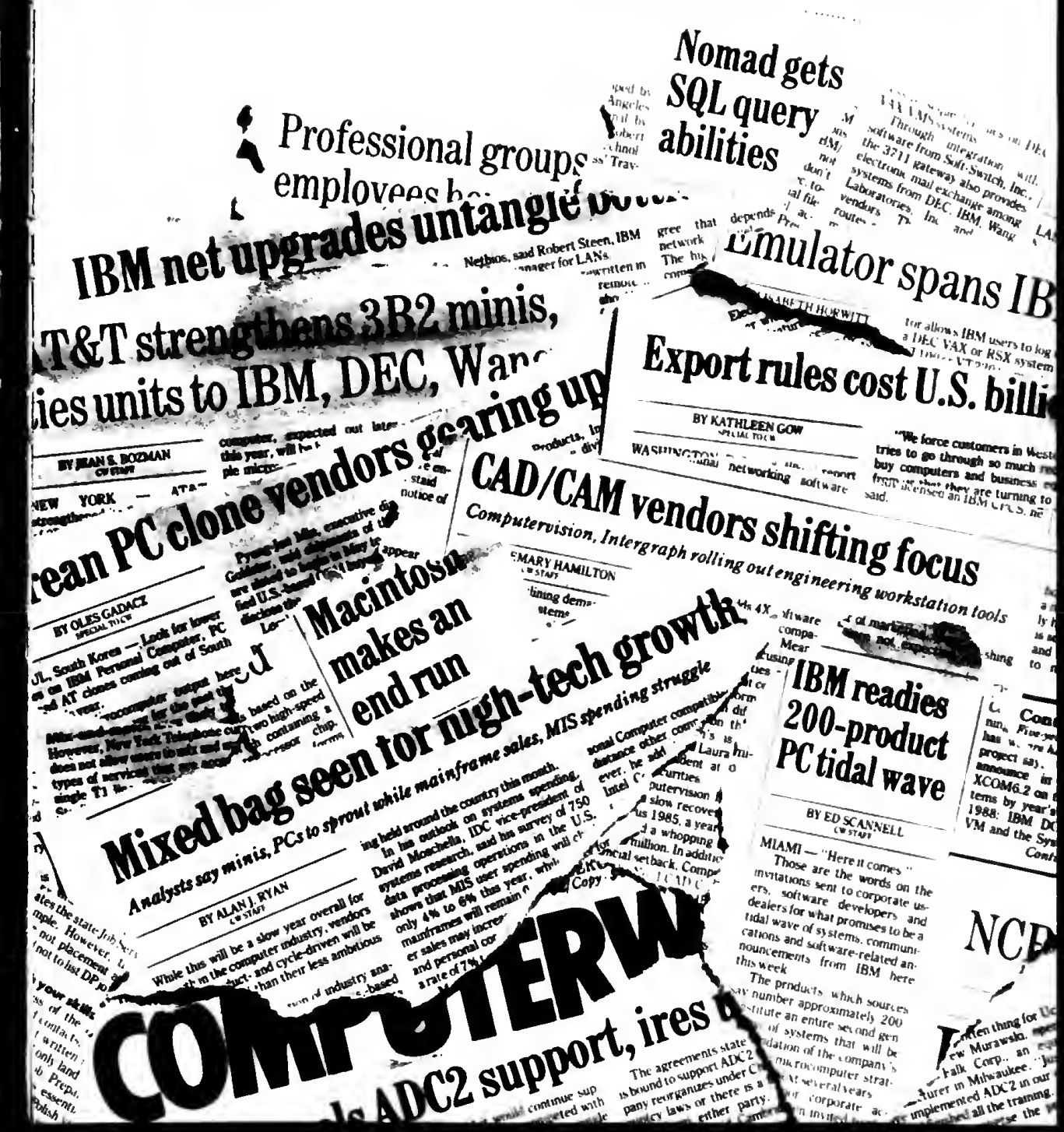

information as well:

DASD

- 4361: String of 3370s (2 9G bytes total) $115,000
- 9370: String of 9335s (3 3G bytes total) $97,000

Tape drives

- 4361: String of 8809s (4 drives, 20K bytes each) $50,000
- 9370: String of 9347s (4 drives, 40K bytes each) $35,000

The benefit of the 9370-compatible devices, other than the obvious cost savings, is that they are not subject to the environmental constraints of the older devices and are housed in a standard 9309 rack. In fact, the Model 60, combined with the 9370-compatible devices shown, will fit into two rack units that together are the size of a large refrigerator.

FOR THE DP industry at large, the 9370 is a significant product that provides new alternatives and solutions. For IBM customers, testing the fit of the 9370 in their own organizations should be interesting.

The 9370 series is compact, powerful, relatively inexpensive and may have more software available for it off the shelf than the Apple II, but where does it fit into the big picture?

In IBM's picture, the 9370 is a legitimate competitor in the departmental computer race in which DEC has lately made a strong showing. If solid software support for Ethernet, ASCII and Token-Ring connectivity is available soon, IBM can use the 9370 to consolidate its dominance in the business PC arena with its mainframe DP base. The 9370 also gives IBM a means to provide canned 370 software solutions to customers without the need for a traditional computing facility. The 9370 is a powerful IBM piece on the game board, opening new markets, consolidating existing ones and intensifying competition with IBM's rivals.

For existing 4361 and 4341 customers who do not see Extended Architecture in their plans, the 9370 means additional computing power will be available at lower cost, either directly via the 9370 itself or indirectly through the further cost depression of used 4300 equipment.

Larger IBM customers will use the 9370 to distribute computing power where it is needed. Technical support staff will probably remain under central DP control, but computing power will begin finding its way into user departments for office automation and other easily decentralized applications.

MIS managers will use the 9370 to gather together the individual PCs and LANs springing up around them and connect them to corporate data and applications. The 9370 will then act as a gateway and control point between the structure of the DP world and the flexibility of the personal computing environment.

Scientific and engineering department managers might find the 9370 a peacemaker, resolving a long-standing conflict between computing systems that could effectively support number-intensive applications and specialized peripherals and a corporate DP management hesitant to support systems that digressed from the 370s entrenched in the data center.

New users will find yet another option in the 9370, an option equipped with a vast array of existing applications software and a migration path consistent through large processors. They are also sure to benefit from the increased competition that the 9370 will certainly engender in the entry-level systems arena.

The 9370 appears to be part of IBM's answer to DEC's challenge for control of the departmental processing market. IBM serves a large installed 370 base. DEC maintains more sophisticated systems-level distribution and networking solutions and historically has been more amenable to supporting other vendors and architectures. With the 9370, the vendor decision gets tougher. •

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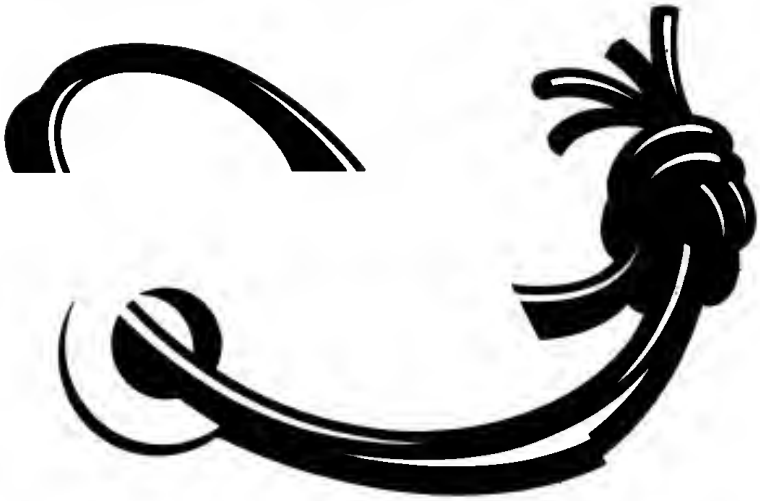

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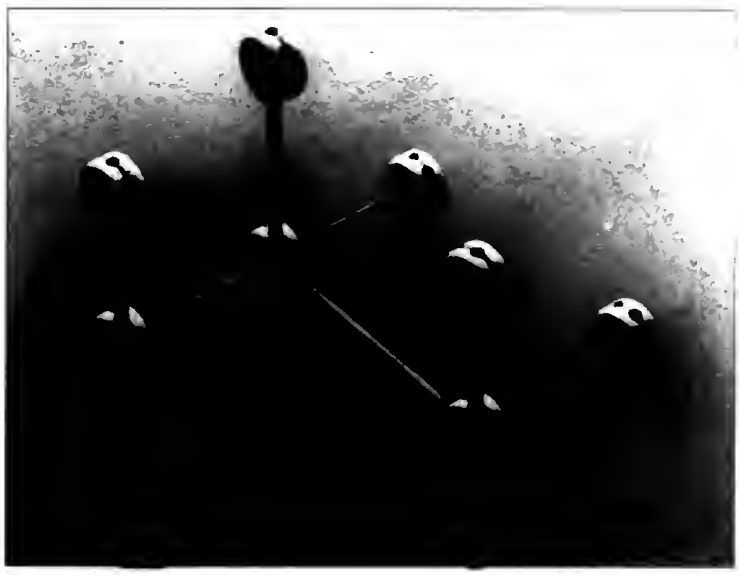
Corporate data models flourish from the bottom up

Project by project, an enterprisewide data model comes to life

BY JAMES M. KERR



Bottom-up enterprise modeling? Isn't that a contradiction in terms? Everyone knows that enterprise modeling is a top-down approach for defining data within an organization, right?

Some years ago, the Engineering Division at Pratt & Whitney embraced what was then a revolutionary concept — integrated data base development through use of a data base management system. Management's commitment to advance data base design drove the division to investigate information engineering techniques and data modeling methods. My participation in that effort inspired personal research into enterprise modeling. Here is what I found:

The broad scope of an enterprise model traditionally made modeling a top-down effort. As a corporate data model, the enterprise model delineates a firm's business rules through its graphical representation of relationships between logical entities. Like all data models, the enterprise model acts as a logical blueprint for physical data base design, a later stage of development. The enterprise model differs from conventional data models in that it defines not just one functional area but the entire organization.

Unfortunately, top-down modeling requires months of daily meetings with appropriate members of top management. I say "unfortunately" not because the folks at the top are uninterested or uncooperative but because they are typically busy people who cannot spare the time to meet with MIS representatives and discuss their firm's information requirements in this kind of depth.

This means MIS faces a problem. Without the necessary participation from those at the top, no enterprise model can be built.

No enterprise model means no integrated data base. Heaven knows we need an integrated data base if we want to cut development costs and reduce the application backlog.

So what do we do? Is there a way to circumvent this fatal flaw in the top-down approach and still produce an enterprisewide model?

There sure is. We will change "top-down" to "bottom-up" and build an enterprise model that will meet our goal of fully exploiting the many benefits of integrated data base technology.

Divide and conquer

Bottom-up enterprise modeling uses an iterative process to integrate project-level data models into one detailed and logically consistent enterprise model. The bottom-up method separates the enterprise modeling task into manageable portions (single projects), allowing the organization to build information systems all the while.

By logically uniting projects in the enterprise model and physically merging them during their DBMS implementation, bottom-up modeling becomes the vehicle through which the firm replaces its current application-specific stand-alone data bases with a centralized data base resource.

As a result, MIS can minimize unplanned data redundancy and enhance data integrity across the company — cutting maintenance costs and freeing time to attack the application development backlog in the process.

This all sounds too good to be true. What do we have to do to get there?

Any company's current data model may already represent a well-prepared base to work from. I consider the following to be guidelines for bottom-up success:

Recognize the difference between an enterprise model and an integrated data base. Far too many firms expect the two to mirror each other, and that just does not happen in reality. The enterprise model offers a logical picture of the

Kerr is a data base administrator at Pratt & Whitney in East Hartford, Conn. He is also adjunct professor in the School of Management at the Hartford Graduate Center of Rensselaer Polytechnic Institute in Troy, N.Y.

- **No model means no integrated data base**
- **Commit to data-driven design**
- **Business modeling vs. data modeling**

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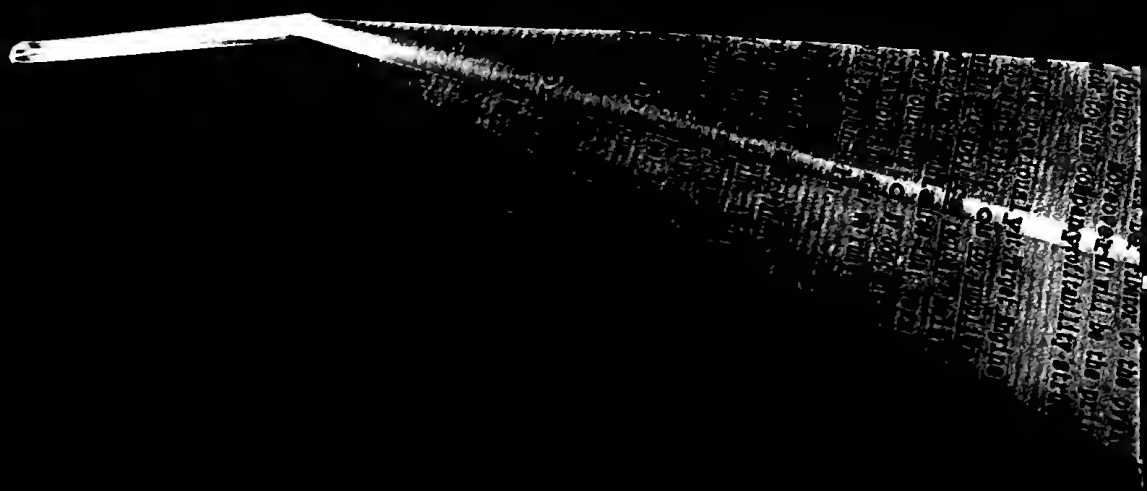

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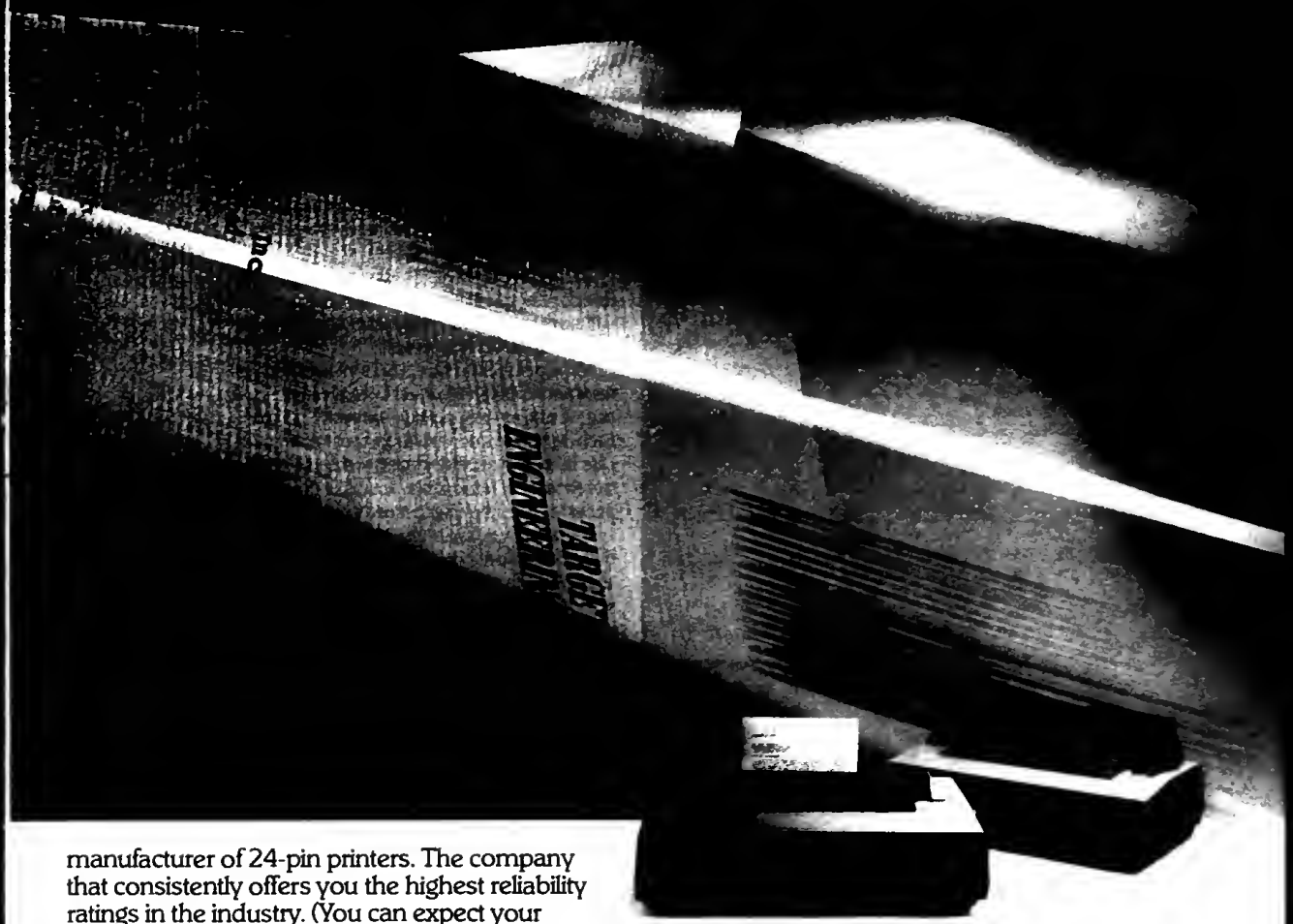

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function's data; the integrated data base forms the actual physical system.

In practice, developers are forced to make concessions in order to physically implement logically designed structures. For example, a developer might collapse logical entities into one data record to improve response time. These concessions push the enterprise model and the data base out of sync.

Select a single DBMS through which all projects will be implemented. Doing so makes physical implementation and integration as easy as adding records to the data base.

Commit to using a data-driven design methodology on all projects. Get into the habit of defining project data models by identifying inherent data relationships rather than procedures or application requirements. This way, you build a more consistent and stable data base. Whereas application requirements change, data relationships remain forever.

Develop a data directory and maintain it. All entities discovered during the design process must be documented in a data directory. The data entered in the directory should follow a definite naming convention for straightforward querying. Although some firms maintain this resource manually, I recommend the acquisition of an automated directory that feeds your DBMS directly. This tool eliminates the need to reenter data definitions into the DBMS's data dictionary.

> EXPECT to train your staff to use the tools that deliver the best results to both it and the company. Take the time — build it into your project schedule.

Adopt a team approach to project development. A team of representatives from Data Administration, Data Base Administration, Application Programming and the user community ensures quality modeling and programming.

Train personnel in the use of tools and methodologies. Expect to train your staff to use the tools that deliver the best results to both it and the company. Take the time — build it into your project schedule. An up-front investment will deliver great returns over the long haul.

As said before, the enterprise model evolves as project data models are developed and integrated into one consistent and detailed model. While the bottom-up enterprise model matures, entities and their relationships — called data constructs — can be extracted and reapplied in new development efforts. Thus, all along the way the enterprise model will serve to reduce the logical design time required to model new projects.

There are five steps to building the enterprise model. First, review the current enterprise model to pinpoint common data. This takes place during logical design and after business modeling. The project team performs the review by comparing the function's business views with current enterprise model entities. If the firm uses a data directory to maintain entity definitions, the team queries the directory; if entities are manually documented, the project team must read through the documentation.

Second, extract the common data from the enterprise model. Simply copy the common data constructs from the model. Include both entities with their corresponding data items and entity relationships. This collection of constructs becomes the touchstone of your data model and the integration point for the enterprise model.

Third, complete the project data model. Define new constructs and add data items to existing ones, as required.

Fourth, integrate the project data model with the enterprise model. The daunting task of integration in this case just means updating the enterprise model by adding the completed project data model to it. You can do this through the common construct. If there is no common construct

Continued on page 77

Building an enterprise model from scratch

Before Project I, no enterprise model existed. At the end of Project I, the project data model forms the rudiments of an enterprise model -- the current model at the beginning of Project II. Project II adds new entities, Y and Z, and Project III adds a new entity plus a new relationship between old entities.

Project	Current Enterprise Model	Extracted Data Constructs	Project Data Model	Enterprise Model After Integration
I	None exists	N/A		
II				
III				

CW CHART

Portrait of a data model

Drafting the logical design of a business and its underlying rules produces a functional corporate masterpiece

Think of how an artist creates a portrait. Typically, he draws a rough sketch of his subject, then brings his work to life by adding detail and color. The logical design process works the same way.

Logical design consists of two processes: business modeling and data modeling. Business modeling produces a high-level sketch of a business function, called a business model. The data modeling process uses that model to create a detailed picture of the function, called a project data model. Together, these models form a function's logical design.

A business model graphically depicts the way information passes between a particular business function and other related business functions within the firm (see chart at right). The model consists of three elements:

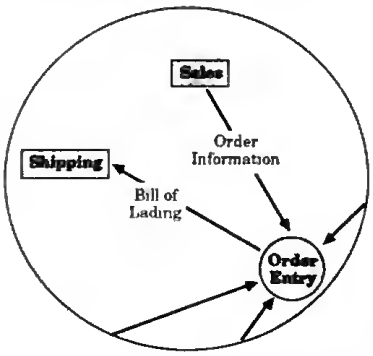
- The business function being studied. The subject of a business model is one area within a firm, such as sales, marketing or engineering.
- Corresponding business functions. Most business procedures require interaction among several business functions. Any that interact with the function under study are called "corresponding business functions."
- Business views, or the packet of information passed between functions during the execution of a business procedure. These come in many forms, from computer-generated reports to hand-written memos. This is how the data contained within current production systems is represented in the enterprise model.

A data model graphically depicts the data that underpins a business model. It documents the function's business rules and represents data interrelationships pictorially in a four-step process:

- It defines the data items contained in each business view.
- It normalizes each view into logical entities. An entity is defined as a group of data items that can be identified by a key composed of one or many data items.
- It determines entity relationships based on business rules.
- It graphically represents the model. Each entity is represented by a rectangle and each relationship by an arrow.

Sample business model

For data modeling purposes, a business model must show the business function under study (that is, order entry), corresponding business functions, such as sales and shipping, and the kinds of information passed between them.



CW CHART

To illustrate, let's start to model the "order information" business view from the chart. First, define the data items. In this case they are order number, customer name, customer address, product number, product price and order date.

Next, normalize the business views into entities. The entity ORDER has two keys: order number and order date. The entity PRODUCT has two keys as well: product name and product price.

Third, determine relationships based on the business rules. For example, the business rule that states a customer can place many orders but that a single order can be placed by only one customer results in a one-to-many relationship between CUSTOMER and ORDER entities.

Last, draw the picture. I'll leave that up to your imagination.

The logical design procedure harvests stable data models based on the culmination of a firm's inherent data properties and current business rules. With stable and consistent data models being built, a firm can embark on the development of a meaningful enterprise model.

JAMES KERR

Data models

FROM PAGE 75

that is, no construct extracted from the enterprise model for use in the project, simply include the project data model, in toto, in the enterprise model. In this way, all modeled data is represented in the enterprise model.

Fifth, update the data directory. Add any new data items and entities to the directory, where they can be referenced for future projects.

Setting steps in action

For example, say Project I is developed prior to the inception of the firm's enterprise model (see chart page 75). With no enterprise model in place, the first project data model completed becomes the enterprise model. Thus, the structure is not only recognized as a business function's data model but as the seed of a corporate enterprise model into which all other project data models will be integrated.

Continuing the example, the project team developing Project II's data model follows the steps outlined above. Upon reviewing the enterprise model, team members find that part of their project's data needs can be satisfied through one of Project I's data constructs. The team extracts the construct for the project's use. It adds its own construct and entity relationship and then integrates the resulting project data model with the enterprise model through the common construct: A new enterprise model has evolved.

Project III's data model highlights an interesting point. During logical design, new entity relationships between previously unrelated entities emerge. This happens because Project II's business function viewed the data differently than did Project III's. In such cases, the more inclusive view is reflected in the enterprise model.

For instance, an accounting function like accounts receivable does not recognize a relationship between "sales representative" and "customer address" entities, but the firm's marketing function does (see chart page 78). Which view should the enterprise model reflect? In order to be accurate, the enterprise model must represent the most inclusive view, even if the relationship is only recognized by one function. Therefore, the marketing function's view is recognized by the enterprise model.

The bottom-up advantage

Based on these rudiments of the bottom-up approach, we can establish a framework in which to compare this approach to its top-down counterpart.

Management, users and MIS are all affected by a firm's decision to build an enterprise model. The degree to which they are affected, however, depends on the choice of modeling methods: top-down or bottom-up. A firm may choose the bottom-up approach for many reasons, but none is more important than the following:

Minimal top management impact. As mentioned at the outset, top-down enterprise modeling requires extensive top management participation; such is not the case in the bottom-up approach. Top executives may monitor and review the organization's enterprise modeling effort, but they are by no means expected to participate in the hands-on development. The bottom-up approach frees top management to tackle other responsibilities while a better model for tactical and strategic decision-making is built.

Enhanced user satisfaction. Top-down modeling is a revolutionary process that results in an MIS development slowdown for the duration of the project. MIS's daily activities come to a standstill because so much time is spent in meetings with management. The evolutionary bottom-up approach offers far fewer meetings, plus information systems that can be used right away. Remember each project data model produced is converted into a DBMS-based system that meets end-user needs immediately.

In addition, since end users participate in the project development effort, they are usually satisfied with the resulting system. Their contributions to the design task — identifying data items and business rules —

greatly improve the quality of the project data model and enterprise model, respectively.

Efficient cost allocation. Typically, each end-user area in a company allocates a portion of its budget to MIS support. The projects developed for that business function are funded through that portion of the budget. Like all MIS projects, enterprise modeling must be funded. But a willing sponsor is difficult to identify because the enterprise model is not built by or for a specific user area. So who foots the bill?

With a top-down approach, the effort requires a special budget. Gaining approval and funding can take months — if MIS can justify this seemingly additional expense at all.

But with a bottom-up approach, the funding comes from the functional areas as they pay for developing particular projects. The price of merging the models through iterative integration is built into the cost of the project modeling effort. In fact, MIS can offset the cost of enterprise modeling through the savings offered by data construct extraction — less data modeling is required to complete a given project model.

Enriched MIS staff. The amount of success you enjoy implementing the bottom-up approach depends on the groundwork you lay, including common DBMS, data directory, data-driven design and so on, and the environment you create. It is clear that MIS staffs must be trained to use these tools and techniques in their development efforts. This only improves their ability to build quality systems that meet user needs.

Some may argue that training is expensive: They're right. But the cost is worth the benefits of companywide information systems. The question is not, "Can we afford to train our personnel in advanced techniques?" but, "Can we afford not to?"

Improved integrated data base opportunities. Like all assets, data needs to be managed. Current data base technology does a lot to help, but to exploit the benefits of integrated data base technology, MIS must work with a comprehensive understanding of the firm's data.

Bottom-up modeling, through its data-driven techniques, gets us there. Top-down cannot because it stops short of the level of detail needed to build a data base system. Can you see your top executives taking the time to identify the data that you manipulate every day? I can't. What is more, I don't think they should have to — that was why they hired me to begin with, right?

As you begin the process, realize one thing. The bottom-up enterprise modeling task, with its techniques of iterative integration and data construct extraction, will never be complete. The firm's enterprise model will evolve as long as there are functions to model or data to identify. But unlike its top-down brother, bottom-up modeling will work. It offers a practical solution to the executive bottleneck and delivers results right from the start.

Within two years, you should begin to enjoy integrated data base systems that support users' needs and an enterprise model that represents a good 50% of the data needed by the firm. Imagine how streamlined systems development will be after that. It's all there for the modeling. •

Sample enterprise model

Accounts Receivable needs to track customers by name, address and the amount of their order. Sales Commissions needs to know the order amount plus the sales representative for that customer. For a follow-up letter, the sales representative needs to know the customer's name and address and any new product that the customer might be interested in.

Application	Current Enterprise Model	Extracted Data Constructs	Project Data Model	Enterprise Model After Intergration
Accounts Receivable	None exists	N/A	Customer address; Customer name; Order amount	Customer address; Customer name; Order amount
Sales Commissions	Customer address; Customer name; Order amount	Order amount	Sales representative; Order amount	Customer address; Sales representative; Customer name; Order amount
Marketing Follow-up Letters	Customer address; Sales representative; Customer name; Order amount	Customer address; Sales representative; Customer name	New Product; Customer address; Sales representative; Customer name	New Product; Customer address; Sales representative; Customer name; Order amount

CW CHART

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Les Gilliam

Your career's review board

The president of the U.S. meets with his Cabinet to seek guidance and support on critical issues. The chief executive officer of a firm meets with the board of directors to review and improve strategic plans. Both the president and the CEO use these power groups for counsel and advice on matters of extreme importance to them.

The successful dynamics of multiple minds focused on a specific problem have been demonstrated repeatedly. The Manhattan Project that produced the atomic bomb and ended World War II is a good example. Perhaps in your own information services department, special project teams have been successful in meeting a high-priority need in a short period of time.

But what about your career? Are you giving it the priority and attention it deserves? Maybe you are just trusting someone else to be in charge of your future. What happens if that someone is not around anymore?

Just recently, I found out that two of my long-time profes-

Continued on page 84

Re-examining job monitoring

BY JEFFRY BEELER
CW STAFF

MEMPHIS — Two-and-a-half years ago, Federal Express Corp. discovered a serious flaw in its computer-based method of measuring the output of its customer service agents and gauging the quality of their work.

In an attempt to raise the level of its service, the firm had adapted its integrated voice/data network to gather statistics about virtually every conceivable aspect of its agents' jobs. The information was then used to set and enforce rigid standards governing the average amount of time the employees could devote to each customer transaction.

But as Federal Express soon learned — to its dismay — its experiment in computer-imposed regimentation led the agents to hold the length of their incoming phone calls to a bare minimum and thus skimp on customer service. In short, the overnight courier's work-performance monitoring system was defeating the very purpose for which it was originally intended.

Today, Federal Express is still as conscientious as ever in collecting statistics that measure its agents' productivity. But while the system itself remains essentially intact, the company has substantially changed the way the accumulated data is used.

As Federal Express's experiences attest, computer-based performance monitoring is ne-

Continued on page 86

UPDATE

Departmental disaster risks

BY AILEEN MACGAHAN
SPECIAL TO CW

Companies create contingency plans to ensure that they can survive disasters — specifically, catastrophes that threaten their major computer centers and critical processing tasks. But what many companies do not realize is that contingencies exist that do not affect mainframe computer centers and central-system work loads.

In fact, departmental and personal computers, workstations and other small to medium-size computers that are spread throughout corporations are often underprotected when it comes to contingency planning. Often, the work performed by these satellite systems is critical.

Effective departmental systems are locat-

Continued on page 82

MANAGERS ON THE MOVE

DP native returns

BY DAVID A. LUDLUM
CW STAFF

Richard A. Kurtti has come home to New York to serve as director of data processing at **Broadcast Music, Inc.** following a career that has taken him to some of the farthest outreaches of the data processing world.

Kurtti, who has dealt with dedicated lines downed by monkeys, says he is as excited as ever about his new challenge — a three- to four-year upgrade of systems and networks under new management at Broadcast Music, which represents more than 84,000 songwriters, composers and music publishers as the world's largest music-licensing organization.

Kurtti comes to Broadcast Music after 13 years at both the Bank of America National Trust and Savings Association and IBM. After studying econometrics at Saint Peter's College in Jersey City, N.J., he joined IBM in 1960, serving in New York and with the Federal Systems Division in Houston, where he worked on the National Aeronautics and Space Administration's Skylab project. But the space race wore him out, he says. "After a year of working virtually double shifts, I felt I was aging at the rate of about five years for each calendar year," Kurtti says.

With an urge to see the world, he and his wife Rosemary joined

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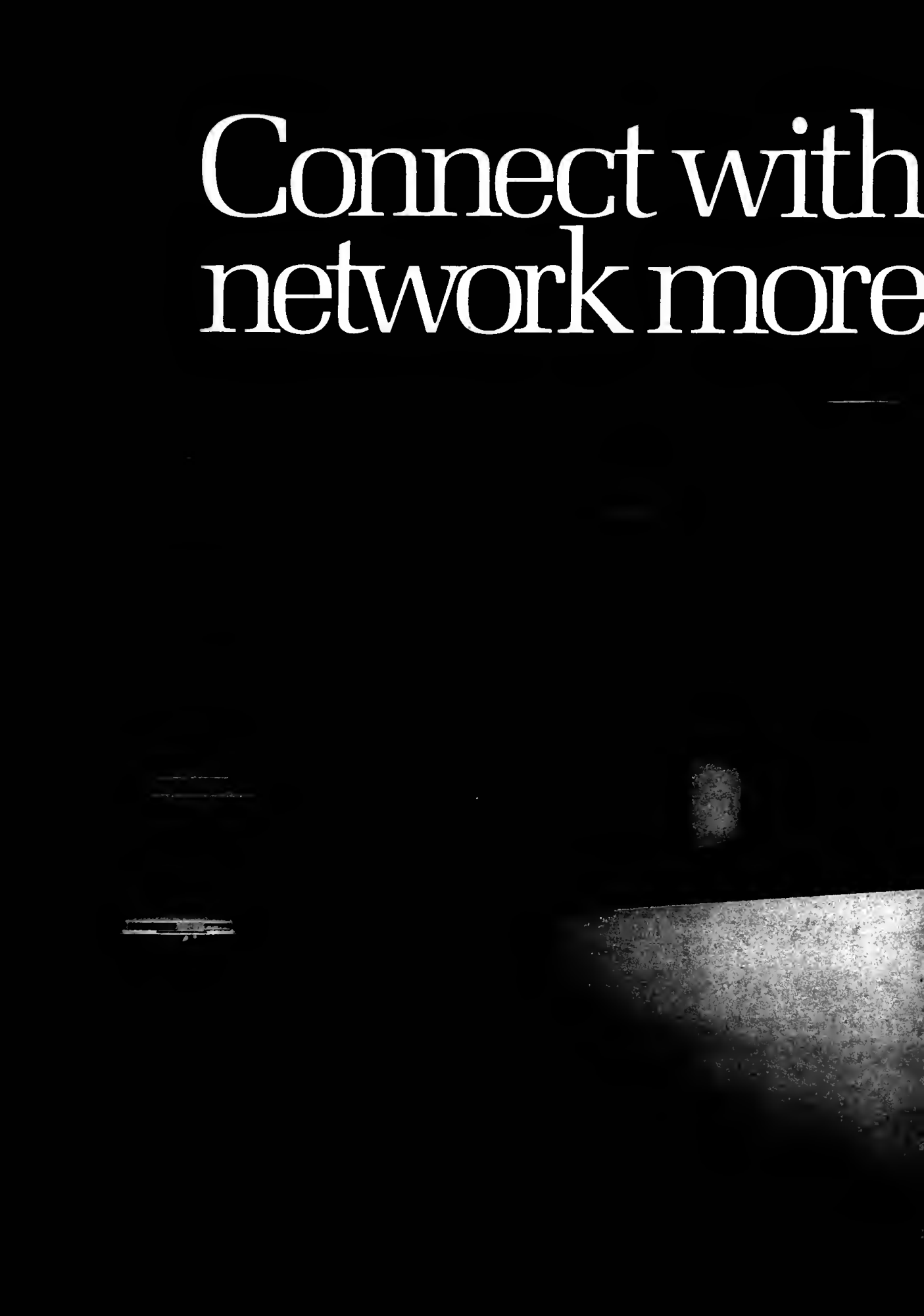

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Disaster risks

CONTINUED FROM PAGE 75

ed close to users. Originally used for basic tasks such as wnrd processing, these smaller configurations have taken nn more critical cnrporate functions. Yet they are geared toward close, hands-on interactinn with their users, who often were the ones to bring these systems into the work place.

Thus, planning for disaster recovery fur these systems must look beyond the computers themselves — the whole department must be taken intn consideration.

Regardless of who actually provides the backup sites, the additinnal contingency plans may well be worth the cost when you consider what can happen when these systems are disrupted.

Learning from experience

One such case involves a major financial services concern that maintains numerous offices across the U.S., including sites in New York and its greater metropolitan area. Contingency planning for the company's mainframe computer centers was directed by the computer center management. It subscribed to a commercial contingency facihty as the basis for this planning.

While in the midst of develnping its plan, a fire occurred in the building that housed one of the company's divisinns, resulting in the building being closed. In addition, the division s work areas, which housed micros, workstations and departmental computers used for communications, were cuvered with soot and debris.

The functions performed in the afflicted site, which involve contact with corporate clients, were critical to the business. However, the corporate computer center, located in a separate bulding, was unaffected. As a result, the disaster was not addressed by the contingency plan.

Although the event was totally outside the scope of the contingency plan, the division quickly re-established operations in a nearby office building, making use of excess space that was in the process of being vacated by another department of the cnmpany.

This space served as a conditioned shell and enabled critical general business functions to be resumed befnre customers were aware of the disaster. Quick recovery was the result of a series of fortunate coincidences rather than careful planning.

In reviewing the experience, management noted several important lessons.

First, the fire could have resulted in serious consequences for the company. The functions performed at the afflicted site were essential to the company's business and critical in terms of customer and contractual relationships.

Second, the disaster that occurred did not involve the company's major computer centers. Because it is a client contact point, the division's most critical resource was access to the company's telecommunications network, located at another site. The departmental computer was important and useful but not critical to the business. However, some equipment was irreplaceable. Fortunately, careful cleaning by a professional company could restore it to service.

Backup options

Having been through this experience and realizing its potential impact, senior management wanted to determine the adequacy of contingency planning in the company's other divisions. A subsequent survey revealed the following:

- Regional offices could send a portion of their critical work loads to other regions in case of a disaster. They believed doing this would give them time to re-establish operatinns at the damaged site. Their alternatives were somewhat limited, since no other company offices were nearby and restaffing in another region, even in an emergency, seemed unlikely.
- Many divisions maintained offices in several locations. These divisions had established reciprocal backup arrangements among these offices.
- Other divisions could not identify cost-effective backup arrangements. These divisions typically maintained large staffs, several departmental computers — including some large configurations — and extensive telecommunications facilities. Their backup requirements were simply too great for reciprocal agreements to be feasible.

In this last instance, a contingency facility of significant size and sophistication would be required to recover from a disaster. Such a facility would be too costly for any one division to develop.

At that time, nn viable commercial vendors were available. The vendor being used by the company's computer center was not set up for this type of contingency. Vendors specializing in providing services to minicomputer sites had not yet entered the market.

In the mnnths following the survey of its divisions, the firm received a proposal from the predminnant vendor of its departmental systems. The vendnr had started a commercial contingency service of its own, offering a choice of a backup site or mobile contingency facility. Eventually, some of the company's divisions signed up with this new service.

Plonning for applications

The issues outlined above tend to be the same for contingency planning for mid-range and departmental systems in general. For example, the accounting department of another financial services company required a contingency plan for its departmental computer, which was used for varinus office applications as well as for networking and data processing.

Management had determined that a customized accounting application was critical to the business. The maximum acceptable recovery interval was 24 hours if the rest of the company was unaffected.

The critical application required extensive disk space as well as the use of a dedicated printer. The disk drives and the departmental computer required special wiring and air-conditioning.

Lead time

This meant that preparing an alternate site would require significant lead time. Since the maximum down time was 24 hours, some advance arrangement for an alternate site was necessary.

The time frame required to obtain replacement equipment was also considered. Because the equipment was in widespread use, the vendor had stated that it could replace the equipment within 24 hours. Even if this promise was optimistic, replacement equipment could be obtained in less time than it would take to identify and prepare an alternate site.

The application normally ran on-line between 8 a.m. and 8 p.m. However, management had determined that while evening operation would be acceptable in an emergency, daytime operation would have to be resumed within a few weeks because of personnel considerations.

Several backup approaches were considered and analyzed.

- Falling back to manual procedures. Manual procedures were determined to be incapable of handling the system's work load.
- Running the critical system at the company's main computer center. The system could not easily be adapted to run on the company's mainframe because management had specifically developed the application for its departmental machine in order to maintain control.
- Using cold sites and hot sites. Developing a cold or hot site was not cost-effective. At that time, no commercial contingency vendors existed for the company's configuration.
- Making reciprocal backup arrangements with similar sites within the company. Of several potential reciprocal backup sites, none was ideal, and daytime use nf the system would be limited or impossible. Thus, the viability of such an arrangement would decrease rapidly with time.

This last approach was adopted as a partial, though inadequate, solution. If a disaster

How will a disaster affect your organization?

In order to determine backup site requirements, an organization must analyze potential disaster scenarios and their probable effects on business operations. The following are examples of generic types of disasters. How they could affect an operation, as well as the probability of occurrence, depends on location and the nature of the operation.

Disasters	Impact 1	2	3	4	Duration of Disaster
Air-conditioning outage			•	•	Hours to days
Contamination in air ducts	•	•	•	•	Hours to weeks
Earthquake	•	•	•	•	Hours to months
Explosion	•	•	•	•	Weeks to months
Fire on floor occupied by company	•	•	•	•	Days to months
Fire on another floor	•	•	•	•	Days to weeks
Heating system failure	•			•	Hours to days
Power outage	•	•	•	•	Hours to days
Riot	•	•	•	•	Hours
Storms and flooding	•	•	•	•	Hours to days
Strike	•	•	•		Days
Telephone outage			•		Hours to weeks

KEY: 1 — Prevent or reduce access to premises. 2 — Injure people or interfere with travel to and from work. 3 — Prevent or reduce access to computer data. 4 — Necessitate restoration or repair to resume operations.

CW: HART, MITCHELL, HAYES

Climate question: Hot site or cold shell?

In relocating a departmental system, a cnmpany sometimes has to relocate the whnle department that the system serves. Therefore, a contingency facility geared toward departmental systems should supply more than computers. It needs to offer space for staff workstations and communications to outside systems.

As with the traditional mainframe facility, two types of contingency facilities are needed — hot sites and cold sites, or shells.

A typical hot site is a fully equipped commercial data center, allowing an organization to access telecommunications and critical applications in a short time. Hot sites are needed for business functions that require immediate recovery and cannot make alternate arrangements such as reciprocal backup agreements.

Hot site and equipment vendors' backup arrangements are useful fnr companies using a specific type of computer, particularly if the departmental computer function can effectively be segregated from the business environment.

Conditioned shells, or cold sites, generally provide an air-conditioned space and raised floor, but little else.

These sites are suitable if recovery does not have to be immediate nr if there is some other short-term arrangement fur immediate recovery, such as reciprocal backup agreements with other company locations.

AILEEN MACGAHAN

were to occur, work would be done evenings on a similar computer elsewhere in the organization; this alternate plan would continue until recovery was complete. Until the department's main vendor offered backup service — a situation that did not come about until recently — the department had only limited backup available.

Several points are significant about both of the above cases. Both organizations failed to include smaller systems in the scope of their contingency plans. In addition, at first, no suitable commercial facilities were available to either organization.

Only recently have services geared toward departmental systems come into existence. For smaller departmental systems, however, it may not be cost-effective to provide for backup through such services.

Internal alternatives

A range of possible internal backup alternatives can exist for a geographically dispersed company. Internal backup alternatives are not always practical, however. While some of the first company's divisions were able to make appropriate plans, planning for other divisions was lacking.

Typically, the latter maintained departmental configurations that were too complex to be backed up by other parts of the organization.

In the case of the second company, internal reciprocal backup arrangements were viable for only a limited period of time.

ONLY RECENTLY have backup services geared toward departmental systems come into existence. For such systems, however, it may not be cost-effective to provide for backup through such services.

Planning for the whole

Since the time that these cases occurred, some commercial backup services for smaller systems have appeared in the market. In addition, some minicomputer vendors such as Digital Equipment Corp. and Wang Laboratories, Inc. now offer backup services to their customers.

Corporate disaster recovery planning needs to address contingencies that go beyond mainframe computer centers and their critical work loads (see story page 82).

There is a need for more contingency centers that provide backups geared toward business functions other than those supported by mainframe computer centers.

Because most companies do not find it cost-effective to develop such sites, the facilities and services will have to be marketed by an equipment vendor, as a commercial venture by others or possibly as a consortium of users.

MacGahan, a New York-based computer security and policy consultant, is author of the book *Computer Fraud and Countermeasures* (Prentice-Hall 1979).

CALENDAR

MAY 17-23

INTEC '87: The Conference on Information Resources & Technology Applications. Washington, D.C., May 17-20 — Contact: Carol Simon, Information Industry Association, Suite 800, 555 New Jersey Ave. N.W., Washington, D.C. 20001.

Infoweek '87. Dallas, May 17-20 — Contact: Uccel Corp., Marketing Communications c/o Financial Systems Division, P.O. Box 660054, Dallas, Texas 75266

International Communications Association 1987 Conference & Exposition. New Orleans, May 17-22 — Contact: ICA, Suite 710, LB-89, 12750 Merit Drive, Dallas, Texas 75251

Bar Coding Seminar Series. Chicago May 18-19 — Contact: Automatic Identification Manufacturers, Inc., 1326 Freeport Road, Pittsburgh, Pa. 15238. Also being held June 8-9 in Atlanta.

The Challenge of Evolving Technologies Conference. Orlando, Fla., May 18-20 — Contact: Scott K. Allen, Life Office Management Association, 5770 Powers Ferry Road, Atlanta, Ga. 30327

Servcon '87: Service and Support for the '90s. New York, May 18-20 — Contact: CESN Publications, Inc., P.O. Box 428, Peterborough, N.H. 03458

Hammer Forum West — Harnessing New Technology: From Vision to Reality. Los Angeles, May 18-20 — Contact: Michael Hammer, Hammer Forum West, 5 Cambridge Center, Cambridge, Mass. 02142

Meeting of the Minds '87, ADP National Accounts Division Users' Conference. Boston, May 18-20 — Contact: Automatic Data Pro-

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Review board

CONTINUED FROM PAGE 79

sional, as well as personal, acquaintances are unemployed. I consider both of these men to be outstanding information systems professionals. In both cases, the mentor, or sponsor, who hired them had been transferred to another location. The new boss made changes that eliminated the need for their services.

I recently read a survey of working people in America who were asked if they were happy with their jobs. More than 60% said no. What are the chief reasons? Some of the typical causes include burnout, boredom, lack of opportunity for advancement, not being appreciated, loss of enthusiasm or even fear of layoff.

But let's recognize that changes are constantly occurring. These may include changes in a company's economic health, changes in management and its philosophy and even changes in your own qualifications and goals.

If you are unhappy, or sense a need to take charge of your own career, perhaps you should seek the advice and counsel of others. Maybe you should apply the power multiplier principle to your career development. After all, the return on investment in your career should be just as important to you as the corporation's return is to its directors.

IF YOU ARE unhappy, or sense a need to take charge of your own career, perhaps you should seek the advice and counsel of others.

The power multiplier principle is probably already at work in your life. Do you discuss your career with your spouse, family or friends? This power group constitutes a most valuable asset in displaying compassion, understanding and encouragement. However, this group may lack the professional knowledge and objectivity to provide sound career advice.

A professional power group may be used in either an informal or formal fashion. The informal alternative, often called networking, includes the contacts you develop among your peer group within the company or your technical or industry associates outside the company. The latter includes professional groups. Former bosses or college professors can also serve in this capacity.

Seeking advice from an informal power group is normally done one-on-one by phone or at some mutually convenient time and place, such as a professional conference. Many times, discussions about your career with an informal group are unplanned and happen by chance. The dynamics of interaction are normally limited to only the two of you in private conversation.

The better alternative may be the formal approach. Would it be feasible for you to establish your own "board of directors," so to speak? Could you identify three to five people who would be willing to serve as your career advisers, or power group? This may be a new concept and not a standard practice by most information systems managers, but are you willing to do something radical and unusual to maximize the rewards of your career?

You should compensate power group members in some way for their time and effort, as compensation sets the formality of the arrangement and allows you to expect some worthwhile guidance and support.

The initial meeting with this power group would start with you describing your background, qualifications, strengths and weaknesses in great detail. Next you would explain your career goals (or lack thereof) and specific problems you face. The power group should then respond with suggestions, alternatives and possible courses of action.

The meeting could address not only how to advance or solve problems with your current career but also whether a change in career should be considered.

You would then meet periodically, say annually, with your private power group to review your career progress and receive further guidance.

The "board" could be a group of associates, each seeking the mutual advice of the others. However, you may not be comfortable in being totally honest with this group, and the advice may not be as well-focused or "thrashed out" as it would be with a private power group.

There are two primary keys to the success of applying the power multiplier principle to your career. First, the members of a power group must have your trust and must be knowledgeable, objective thinkers.

Second, your preparations for the sessions must include documenting your problems, goals and priorities and preparing an honest self-appraisal.

There can be many benefits to using a power group as career advisers. The group can provide new ideas, contacts, examples of success and encouragement. The expectations that a power group establishes can also provide motivation for your commitment to success.

Gilham is an independent computer and management consultant with 30 years of experience based in Ponca City, Okla.

Continued from page 83

cessing, Suite 580, 5665 Northside Drive, Atlanta, Ga. 30328

Patricia Seybold's Technology Forum — Tools for Visionary Business Users. Cambridge, Mass., May 18-20 — Contact: Patricia Seybold's Office Computing Group, Suite 612, 148 State St., Boston, Mass. 02109.

Navy Micro/OA '87. Virginia Beach, Va., May 18-21 — Contact: NARDAC Norfolk, Navy Micro/OA '87, Norfolk, Va. 23511

Eighth Annual Conference on Applications of Computer-Aided Systems Engineering Tools. Ann Arbor, Mich., May 18-22 — Contact: Rebecca S. Sizemore, Meta Systems, Ltd., Suite 200, 315 E. Eisenhower, Ann Arbor, Mich. 48108.

Second International Symposium on the Factory of the Future. Montego Bay, Jamaica, May 18-22 — Contact: David W. Russell, Pennsylvania State University Graduate Center, 650 S. Henderson Road, King of Prussia, Pa. 19406.

New Aids to Executive Decision-Making. New York, May 19-20 — Contact: The Conference Board, Inc., P.O. Box 4026, Church Street Station, New York, N.Y. 10261

Western States Government Technology Conference 87. Sacramento, Calif., May 19-21 — Contact: Government Technology Conference, P.O. Box 160288, Sacramento, Calif. 95816

Technobank. Geneva, May 19-22 — Contact: Technobank P.O. Box 625, CH-1211 Geneva 1, Switzerland

Interconnections '87, the Independent Computer Consultants Association's 10th

Continued on page 90

LOCAL HAPPENINGS

MAY

Legislating the Software Industry: Promise or Peril. Palo Alto, Calif. May 14, 6:30 p.m. — Contact: Software Services Association, P.O. Box 6413, San Jose, Calif. 95150.

Desktop Publishing. New York. May 14, 11:30 a.m. — Contact: Direct Marketing Computer Association, 315 W. 58th St., New York, N.Y. 10019.

PC Graphics. Boston. May 15, 11:30 a.m. — Contact: Society for Management of Professional Computing, 715 Boylston St., Boston, Mass. 02116.

Third Annual Sales & Marketing Software Conference. Wellesley, Mass. May 19 — Contact: Sales & Marketing Executives of Greater Boston, Inc., 6 Abbott Road, Wellesley Hills, Mass. 02181.

California Computer & Graphics Show. Palo Alto, Calif. May 28, noon-6 p.m. — Contact: Norm De Nardi Enterprises, #204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

JUNE

An Overview of Data Processing Politics. New York. June 3, 6-9 p.m. — Contact: New York City Chapter of the Association for Computing Machinery, P.O. Box 245, New York, N.Y. 10163.

Logic Programming for Artificial Intelligence. San Francisco. June 3, 5:30 p.m. — Contact: Association for Women in Computing, Bay Area Chapter, Suite 1044, 41 Sutter St., San Francisco, Calif. 94104.

The Super Computer Era. Boston. June 9, 7:30 a.m. — Contact: The Computer Museum, 300 Congress St., Boston, Mass. 02210.

Re-examining

FROM PAGE 79

ther helpful nor harmful in and of itself. Whether the practice solves problems or creates them depends on how it is managed.

"We used to base 70% of our agents' performance evaluations on the statistics we gathered about how they did their jobs," says Robert Hernandez, Federal Express's vice-president of customer service. "Now, the reviews are weighted only 20% toward statistics and 80% toward subjective judgments of work quality. The emphasis in our employee evaluations has shifted."

Probably nowhere has the shift been more evident, or had a more lasting impact, than in the way the firm uses its measurements of the average length of each agent's customer transactions. Although the critical variable continues to be closely monitored, it is no longer considered relevant to the courier service's evaluations of its operators' individual performance.

> "YOU CAN'T just audit for quality. You have to teach people what their jobs are and how to do them."
>
> ROBERT HERNANDEZ
> FEDERAL EXPRESS CORP.

Instead, Federal Express uses the information only to rate its agents' collective productivity, Hernandez says. The result is a reduction in pressure on the call-takers to dispense with each customer inquiry as quickly as possible and an accompanying improvement in the quality of the company's service.

Nor did the rise in quality come at the expense of quantity. On the contrary, "We're now seeing the highest levels of productivity that we've ever experienced among our customer service agents," Hernandez says.

How can the organization achieve the seemingly contradictory goal of boosting its per-employee output and, at the same time, ensuring high levels of service quality? The answer lies in the extensive use of training. "You can't just audit for quality," Hernandez says. "You have to teach people what their jobs are and how to do them."

Federal Express's history in work-performance monitoring dates from a period of rapid growth several years ago that prompted the firm to establish what has since become a nationwide network of 14 customer service centers employing 2,000 agents. Each day, the centers together receive an average of 200,000 phone calls from customers. Using individual terminals, the service representatives enter customer orders into Federal Express's data base or retrieve desired information and relay it over digital phones to their waiting callers.

As a natural byproduct of supporting the customer service operators, the firm's system also notes the duration of each incoming call, the number of transactions each employee processes per day and other pertinent performance data.

At first, Federal Express used the collected statistics to make sure that, on the average, its agents completed each customer call within a specified amount of time. Failure to meet the requirement could hurt the representatives in their next performance review.

But before long, the employees began asking their supervisors some troubling questions. "They wanted to know how they could fulfill their primary role, which is to tend to the customer's needs, when they had to handle their calls within a strict time limit," Hernandez recalls. "In our monitoring, we could tell we were losing some of our ability to serve our customers."

This led the company — about 2½ years ago — to drastically redefine how it uses its work-performance numbers as a management tool.

Today, only two computer-collected statistics figure in Federal Express's evaluations of its customer service agents. One refers to the amount of absenteeism and the other to the average elapsed time between phone calls.

DP native

FROM PAGE 79

Bank of America, where they worked for the next 13 years in San Francisco, the Philippines, Malawi, London and Istanbul.

Kurtti saw much of the Pacific Basin during three years at the home of the bank's Asian division in the Philippines, supporting computer facilities in Japan, Hong Kong, Malaysia, Singapore, Guam, Taiwan and Australia, generally working side-by-side with his wife.

Next, the couple helped start an international DP advisory service at the bank, spending more than two years developing a real-time teller-posting system for Commercial Bank of Malawi. "God's good assistance helps when you try to install an on-line posting system in a small African country," Kurtti says. "Six-day workweeks help, too."

After setting up a London office for the advisory service, the Kurttis tackled a bigger project in automating Istanbul's Interbank, also known as Uluslararasi Emdustri Ve Ticaret Bankasi. They then returned to San Francisco and, after having worked around the world, the couple decided to vacation around the world and took a year off.

At Broadcast Music, the new management hopes to enhance the company's competitive stance with new technology, Kurtti says. One thrust is to give clients more immediate access to data on their royalties with tools such as fourth-generation languages and a relational data base. That calls for upgrading a DOS/VSE system on an IBM 4381 to MVS.

Of his foreign exposure,

Richard Kurtti

Kurtti says he had a lot of fun, although he probably would have done better from a career perspective staying with IBM or in New York. "But I would have missed scuba diving in the Philippines and being chased by a hippo in Malawi and the good shish kebab in Istanbul. If I had to do it over again, I'd do it precisely the same way," he says.

Computer Consoles, Inc. has appointed **Peter C. Engle** as vice-president of management information systems, with responsibility for the planning, operations and management of computing to support finance, manufacturing, sales and customer service worldwide.

Engle joined the company, a supplier of computer systems for office and communications markets, from the former Burroughs Corp. in Rochester, N.Y., where he spent 15 years in financial, operations, marketing and MIS positions.

Charles P. Reed Jr. has been named vice-president of **Heery International, Inc.**, where he will continue as director of information resources for the Atlanta-based provider of services for the building and construction industry.

Reed's responsibility is to design, develop and implement computer-aided design and office automation systems. He also serves as a consultant to Heery clients for their computer systems, communications and facilities.

Reed joined Heery five years ago after 32 years with the Georgia Institute of Technology in Atlanta, where he was director of computer services.

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NETWORKING

Continued from page 85

Annual National Conferenoce. San Francisco, May 20-22 — Contact: ICCA, P.O. Box 27412, St Louis, Mo 63141

Distribution Computer Expo. Chicago, May 21-22 — Contact: C S. Report, Box 453, Exton, Pa. 19341.

1987 NYU Symposium: Technological Support for Workgroup Collaboration. New York, May 21-22 — Contact: Center for Research on Information Systems, New York University, 90 Trinity Place, New York, N.Y. 10006.

MAY 24-30

Icographics '87: Second International Conference and Exhibition on Computer Graphics. Milan, Italy, May 26-29 — Contact: World Computer Graphics Association, Inc., Suite 399, 2033 M St. N.W., Washington, D.C. 20036.

Workshops on Computer-Aasisted Map Analysis. New Haven, Conn., May 27-28 — Contact: Joseph K. Berry, School of Forestry and Environmental Studies, Yale University, 205 Prospect St., New Haven, Conn. 06511. Also being held June 9-10 in Tucson, Ariz.; June 17-18 in Athens, Ga.; Sept. 16-17 in Corvallis, Ore.; and Oct. 24-25 in Berkeley, Calif.

Computer and Network Security '87. Washington, D.C., May 27-29 — Contact: Institute for International Research, Inc , Suite 1212, 310 Madison Ave , New York, N.Y. 10017.

CASE '87. First International Workshop on Computer-Aided Software Engineering. Cambridge, Mass., May 27-29 — Contact: Elliot Chikofsky, Index Technology Corp , One Main St., Cambridge, Mass. 02142.

1987 Information Management Conference. Toronto, May 27-29 — Contact: John Hobbs, Data Base Association (Ontario), Inc., P.O. Box 5639, Station A, Toronto, Ont., Canada M5W 1N8

California Computer & Graphics Show. Palo Alto, Calif., May 28 — Contact: Norm De Nardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

Productivity: A Path to Peak Performance, the Seventh Annual Information Processing Seminar. St. Charles, Ill., May 28-29 — Contact: Registration Coordinator, Arthur Andersen & Co., 69 W Washington St., Chicago, Ill. 60602.

Clinical Information Systems Management: The Crucial Differences. Atlanta, May 28-29 — Contact: Vicki Hall, HBO & Co., 301 Perimeter Center N., Atlanta, Ga. 30046

Association for Computing Machinery Professional Development Seminars. Boston, May 30 — Contact: Cullinane Hall 161CN, College of Computer Science, Northeastern University, 360 Huntington Ave., Boston, Mass. 02115.

MAY 31-JUNE 6

ABA National Operations and Automation Conference. San Francisco, May 31-June 3 — Contact: American Bankers Association, 1120 Connecticut Ave, N.W., Washington, D.C. 20036.

ISDN '87: Symposium on Integrated Services in Digital Networks for Telecommunications. Monterey, Calif., May 31-June 4 — Contact: Russ deWitt, Contel Service Corp., 245 Perimeter Center Pkwy., Atlanta, Ga. 30346.

Fuse '87, The National Focus Users Meeting. Palm Desert, Calif., May 31-June 5 — Contact: Fuse, Inc , Suite 4302, 450 7th Ave., New York, N.Y. 10123.

Seventh Annual Conference of the Association of Human Resource Systems Professionals. Minneapolis, June 1-3 — Contact: HRSP, Inc., P.O. Box 8040-A202, Walnut Creek, Calif. 94596.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

James A. Martin

Add-in firms face battle

When IBM announced its Personal System/2 line more than a month ago, it was time for the third-party add-in board companies to put on a happy face, throw open outstretched arms and turn the other cheek — the same way one might greet an unwelcome relative.

The fact is, IBM's new computer line already comes equipped with many of the things the add-in companies are currently selling to IBM Personal Computer users. In addition, the PS/2, excluding the low-end Model 30, is equipped with the much-discussed Micro Channel architecture, which, to make a long story short, will not accommodate existing add-in board products.

Thus it surprised a few of us when, following the announcements, major vendors of memory boards, accelerator cards and the like began to praise the IBM announcement.

The consensus was something like this: "We're glad they finally terminated the suspense and speculation so we can concentrate on designing products for these machines, as they will surely need enhancement cards in no time."

That all sounds peachy, but what would one expect these companies to do, weep in public? Marketing and image is extremely important in this industry, and no one wants to be caught pushing his product strategy director off a California cliff.

The reality of the situation is that the PS/2 is most certainly going to have a direct impact on the enhancement board industry in the short and long terms. How much of an impact depends directly on the success of the new computers.

No one can say yet how the new micros are ultimately going to be accepted by end users. A *Computerworld* survey predicted that 39% of MIS micro purchases made during the next 12 months would be in the PS/2

Continued on page 94

Will 386s find life after PS/2?

Acer pitches micro as price/performance alternative to AT, Model 50

BY JAMES A. MARTIN
CW STAFF

SAN JOSE, Calif. — The life of the microcomputer and peripherals industry after the IBM Personal System/2 is the talk of Silicon Valley these days. One particular topic is vendors such as Compaq Computer Corp., Wyse Technology and Corvus Systems, Inc. that jumped the gun on IBM with their own Intel Corp. 80386-based machines.

Because the IBM PS/2 Model 80 features the new Micro Channel architecture, various 80386-based micros from other vendors are incompatible. How, then, do you compete with IBM's 386 machine when the 386 box you have been marketing is not even of the same architecture?

For Acer Technologies Corp., the answer is simple. You don't.

San Jose-based Acer, formerly known as Multitech Electronics, Inc., is the American marketing and distribution arm of MSC Group in Taiwan. Acer began shipping its 80386-based 1100 microcomputer in March one month before the IBM PS/2 announcements.

The best marketing strategy in this situation was not to position the 1100 against the upcoming IBM 80386s, but to promote it as a price/performance alternative to IBM's 80286-based machines, according to Acer President Stephen R. McKenzie.

"IBM's announcement was good news to us in the area of price points," McKenzie said in a recent interview. "We can position our 386 machine for less than their 286 machines on a price/performance basis — and for the time being, that's how it will be marketed."

In addition, McKenzie said that IBM's PS/2 Model 80 line is "still looking for software and applications," while the 1100 can run existing software for the

Continued on page 93

Insurance deal EDS's biggest

BY ALAN J. RYAN
CW STAFF

DALLAS — Electronic Data Systems Corp. (EDS) has signed its largest insurance industry contract ever with National Account Service Company (Nasco), a joint venture of Blue Cross and Blue Shield plans in five of the most populous states in the U.S.

No dollar figure was released but an EDS spokesman said the multiyear deal was the largest insurance pact ever obtained by EDS.

Nasco members are Blue Cross and Blue Shield of Michigan, Blue Cross and Blue Shield of Connecticut, Blue Cross and Blue Shield of New Jersey, Empire Blue Cross and Blue Shield in New York and Blue Shield of California. The combined plans currently provide health care coverage to 20 million people.

Through the deal, EDS will provide claims processing, membership processing, statistical reporting and data analysis to Nasco through its Total Plan.

Continued on page 92

ETA lures Ledbetter from Prime

BY STANLEY GIBSON
CW STAFF

ST. PAUL, Minn. — ETA Systems, Inc. last week named Carl Ledbetter to the newly created position of executive vice-president of operations, effective immediately.

Ledbetter comes to ETA after just nine months at Prime Computer, Inc., where he oversaw the relationship between Prime and Cydrome, a Milpitas, Calif.-based minisupercomputer maker that is developing a machine to be marketed by Prime.

Ledbetter's duties at Natick, Mass.-based Prime will be taken over temporarily by Robert Fischer, 50, president and chief executive officer of Prime's computer-aided design and manufacturing business group.

Carl Ledbetter

"Carl will be replaced, but we don't have anyone as yet," a Prime spokesman said. "It will be a loss, there's no question. But he felt it was an opportunity he could not pass up — to work on a Cray-class machine."

The Prime spokesman said the Cydrome project is on schedule and will produce a minisupercomputer to be shipped later this year.

A former IBM executive, Ledbetter, 37, will be responsible for all marketing, manufacturing, finance and personnel functions of ETA. "All my life, I have been interested in working with as fast a machine as I could," Ledbetter said. "And for several years, I have been very interested in trying to make sure the U.S. has the right technology in supercomputing."

Two weeks ago, ETA Systems rolled out the ETA 10, which ETA claims will be the fastest supercomputer in the world. ETA is a subsidiary of Control Data Corp.

Inside

Dialcom plots E-mail recovery plan

BY MITCH BETTS
CW STAFF

ROCKVILLE, Md. — Drawing on the deep pockets of its parent British Telecommunications PLC, Dialcom, Inc. is plotting a business recovery that is intended to boost its U.S. market share in the competitive electronic mail industry.

In the last few months, Dialcom has brought on a new executive team, consolidated its operations in Rockville, built a new computer center and introduced a round of products, including the industry's first X.400 message-handling system.

"With these investments, we've taken Dialcom into a very heavy loss situation — which was clearly planned and budgeted for — to provide the foundation for this operation," Dialcom President John Morris said in a recent interview. "But we expect Dialcom to come back over the next two years."

Dialcom is certainly acting with confidence. Last week, it formally opened its Rockville headquarters with true British pomp and circumstance. The VIP list included attendees Sir Antony Acland, British Ambassador to the U.S. and Her Royal Highness Princess Alexandra, who exchanged electronic mail messages with Buckingham Palace.

British Telecom, which bought Dialcom from ITT Corp. in May 1986, is making the capital investment in Dialcom because it considers Dialcom essential to its long-range goal of becoming a worldwide electronic messaging vendor, according to Mark Winther, an analyst with Link Resources Inc. in New York.

Winther said British Telecom bought Dialcom largely because of its X.400 capabilities and licenses with numerous foreign postal and telecommunications authorities.

"Linking them together will give them a very powerful world-

Continued on page 99

Dialcom: Back in the pack

U.S. electronic mail market share by revenue, 1986

Easylink	**29.5%**	*(Western Union Telegraph Co.)*
Quik-Comm	**10.5%**	*(General Electric Information Services Co.)*
MCI Mail	**10.1%**	*(MCI Communications Corp.)*
Dialcom	**9.3%**	*(Dialcom, Inc.)*
Telemail	**9.3%**	*(Telenet Communications Corp.)*
Ontyme	**7.6%**	*(Tymnet)*
Others	**23.7%**	

INFORMATION PROVIDED BY LINK RESOURCES CORP.
CW CHART

Insurance

FROM PAGE 91

System, which is currently used to provide integrated health care processing services to Blue Cross and Blue Shield plans in seven states.

EDS's centralized health care administration system, worldwide telecommunications network and information processing centers will service Nasco through electronic links to Blue Cross and Blue Shield plans nationally, a spokesman said.

The pact, which will last more than 11 years with an option to extend, deals with multistate corporations for which Nasco underwrites.

EDS made several other announcements last week, including a 10-year contract with another health insurance provider, a joint venture company in Japan and the acquisition of a publisher of technical manuals.

Blue Cross and Blue Shield of Arizona signed a 10-year facilities management contract with EDS through which EDS will provide complete data processing services for the Arizona health insurer.

In conjunction with that agreement, EDS and Blue Shield of California have agreed to extend their contract until 1997 and consolidate the Arizona processing onto the system currently used by Blue Shield of California. The contracts are not related to the Nasco deal

Venture company formed

In an unrelated announcement, EDS and Nippon Information Industry Corp. (NII) in Japan have formed a joint venture company to be called Nippon EDS (NEDS). The focus of the venture will be large-scale computer services and telecommunications projects.

NEDS will have access to EDS's worldwide resources. EDS said it will install a regional network node tied into both EDS's international telecommunications network and a domestic network in Japan.

NII specializes in facilities management and is one of the largest systems software houses in Japan. In 1986, NII revenue increased 25%. NII currently employs 1,400. Private sector activities account for 85% of its business and government activities for the remaining 15%.

Also announced last week was EDS's acquisition of Amtec Information Services, Inc. in Lakewood, Calif., a publisher of technical manuals and service catalogs for the automobile, aviation and legal industries.

Amtec recently introduced a compact-disk read-only memory-based data storage and retrieval system called Opti/Search. As a result of the acquisition, Amtec's 267 employees will join the EDS staff.

Phoenix secures BIOS copyright

BY CLINTON WILDER
CW STAFF

NORWOOD, Mass. — Preparing for possible further legal action against alleged pirates of its IBM-compatible read-only memory (ROM) BIOS, Phoenix Technologies Ltd. has achieved full copyright status for its ROM BIOS in Taiwan.

The copyright protection applies to Phoenix's compatibility software for clones of the IBM Personal Computer AT and XT.

The copyright status will serve as a signal to several Taiwanese firms allegedly pirating and selling the Phoenix BIOS without a license, according to Bob Angelo, Phoenix's vice-president of marketing.

Angelo said Phoenix and its Taipei-based distributor, Micro Electronics Co., have assembled evidence against a number of alleged pirates in Taiwan.

Copyright status allows a company to take legal action against firms that infringe the copyright or illegally copy the copyrighted products.

Phoenix launched its antipiracy campaign in February when it announced an undisclosed cash settlement with a Toronto-based clonemaker allegedly pirating the Phoenix BIOS [CW, Feb. 23].

Life after PS/2

FROM PAGE 91

Microsoft Corp. MS-DOS environment.

With a list price of $3,995 for a standard configuration of 1M byte of on-board random-access memory and a clock speed of 16 MHz, Acer hopes its 1100 will interest users who would otherwise be considering IBM's 286-based Personal Computer AT and PS/2 Models 50 and 60. The AT lists for $4,595, the Model 50 for $3,595 and the Model 60 for $5,295.

"We're positioning the 1100 for such applications as network servers and heavy Lotus Development Corp. 1-2-3 users," McKenzie said.

Acer's marketing strategy for the 386 should help the company get a toehold in the increasingly competitive U.S. marketplace, according to William Zachmann, vice-president of research for International Data Corp. in Framingham, Mass.

"An inexpensive 386 machine could be a hell of an alternative to those really expensive PS/2 models," Zachmann said.

Eventually, Acer's 1100 will be competing with an IBM 80386-based microcomputer, the PS/2 Model 70, according to Norm DeWitt, a micro analyst at Dataquest, Inc. in San Jose.

"Acer has an excellent strategy at this point in time," DeWitt said. "But it won't be too many months before it goes up against a Model 70."

Acer is gambling that the 1100 will not trail far behind Compaq's Deskpro 386 micro. Since March, Acer has shipped and distributed more than 500 of its Taiwan-built 1100 models to the U.S., mainly to OEMs and value-added resellers. However, the company said it expects to be shipping 5,000 units per month by the end of the year.

A spokesman for Compaq in Houston said the company was not aware of Acer or Multitech and that Compaq did not plan to change its marketing strategy for the Deskpro 386 in light of the IBM announcements. The Deskpro 386 will continue to be positioned as a high-end MS-DOS PC, while the PS/2 high-end micros are still months away.

Stephen R. McKenzie

from availability, he said.

Four-year-old Acer is gearing up its efforts to crack the U.S. microcomputer market. The 50-employee U.S. company said it expects $50 million in revenue this year. MSC Group had $200 million in worldwide sales in 1986.

Future plans include Acer's entering microcomputer networking through an OEM agreement with Novell Inc.

The company also expressed hopes to position its 386 box as an AT&T Unix machine later this year. Furthermore, Acer said it is planning to announce a desktop publishing package at Comdex '87 in Atlanta this spring. That package will include the Acer LP-75 laser printer said to be fully compatible with the Hewlett-Packard Co. LaserJet Series II.

But Acer is facing an uphill battle in most cases. The 80286 and 80386 microcomputer markets are becoming increasingly competitive with the desktop publishing and networking system wars just getting started. It still remains to be seen whether corporate America will further embrace the lower priced foreign-assembled PC clones.

"With our emphasis on value engineering and a generous warranty, we feel that we rise above the clone level and are positioned more into the compatible market," McKenzie said.

Of MSC Group's total 1986 microcomputer sales, 40% were in Europe and 35% were in the U.S., with the remainder in Asia. McKenzie said MSC hopes to become the leading vendor of 386-based machines to the Far Eastern market, adding, "We want to become the Compaq of Asia."

Uccel, Hogan report rapid financial growth

BY CLINTON WILDER
CW STAFF

DALLAS — Uccel Corp. and Hogan Systems, Inc., two major mainframe software vendors based here, both reported strong financial growth in results announced last week.

Uccel, continuing its successful transition to becoming primarily a vendor of IBM systems software, announced a 53% first-quarter increase in profits on a 26% gain in revenue.

Hogan Systems returned to profitability in its fiscal year ended March 31. Although Hogan signed a landmark 20-year exclusive marketing agreement with IBM during the year, sales through IBM had little direct impact on fiscal 1987, analysts said recently [CW, April 27].

Uccel Chairman Gregory J. Liemandt noted that systems software accounted for 84% of Uccel's revenue in the first quarter ended March 31, up from 64% in the year-earlier quarter. Overall, Uccel's revenue from systems software was 65% higher than in the first quarter of 1986, due mainly to products and companies Uccel acquired in the past year.

Uccel reported a profit of $4.3 million, or 25 cents per share, compared with $2.8 million, or 17 cents per share, one year earlier.

Revenue for the quarter ended March 31 was $42.8 million, up from $34.1 million in last year's first quarter, which was reclassified to reflect Uccel's divestiture of its turnkey systems and computing services businesses.

Hogan Systems reported a profit for the year of $9.5 million, or 66 cents per share, compared with a loss of $6.9 million, or 52 cents per share, in fiscal 1986. Revenue increased 63% from $27 million to $44.1 million. For the fourth quarter, net income was $3.7 million, or 25 cents per share, compared with a year-earlier loss of $4.2 million, or 32 cents per share.

Add-in firms

CONTINUED FROM PAGE 91

line [CW, May 4]. But sales of IBM's older PC XTs and ATs and their compatibles have been hot all year and actually increased after the IBM announcement.

Several of the higher end IBM models, particularly the Intel Corp. 80386-based machines, won't be available for months. No operating system or software applications for these boxes exists yet, so many users will be understandably reluctant to dive right in.

Meanwhile, prices are continuing to drop on older IBM models and their compatibles and clones, which adds enormously to their attraction. This means that in the short term, there will be more XTs, ATs and vanilla PCs out there, many of which will need enhancing at some point.

This is good news for board and graphics enhancement companies like AST Research, Inc., Quadram Corp., Hercules Computer Technology, Inc. and Ideassociates, Inc.

But what happens if and when the PS/2 takes off? There's no doubt those companies with the resources and ambition to enter that market can and will — but not without some pain. The biggest pill to swallow will be in research and development, as the board makers will have to come up with completely new designs for a new market.

Along with that burden is the need to be the first, or at least one of the first, to release a product.

For smaller board makers with only a few products and without large funding for additional research and development and marketing efforts, the IBM unveilings could prove ultimately shattering. There are likely to be some casualties down the road.

There are alternatives, however. No one is being physically forced to follow IBM. Many of the board makers will, when pressed, drop the sunshine and lollipops routine and admit they're not quite sure what to do now. That's certainly understandable, given that a good number of them won't even have the PS/2 specs for weeks.

Plus Development Corp., which manufactures the Hardcard add-in hard-disk and controller board, recently said it hadn't decided in which direction to turn for future product strategy. One alternative the company is considering is to develop a product for Apple Computer, Inc.'s Macintosh in addition to, or instead of, the new IBM boxes, since either direction would constitute a whole new market.

The lesson that will be learned from this experience is a fundamental one: only the strong survive. Any reasonably ambitious company with at least some financial resources and an interest in remaining in the IBM microcomputer market should be able to do so and prosper. Those who don't were most likely on shaky ground anyway.

Technology has always changed and will continue to do so. One of the most important challenges in this industry is to have the flexibility and foresight to change with it. If you're incapable or uninterested, then you deserve what you get.

Martin is *Computerworld's* West Coast correspondent.

NICKELS & DIMES

Cray Research, Inc. announced revenue for the first quarter ended March 31 of $214.1 million, compared with $142 million in the previous year. Profits were $57.2 million, or $1.79 per share, compared with $30.9 million, or $1 per share, in the like period a year ago.

General Datacomm Industries, Inc. reported revenue for the second quarter ended March 31 of $53.3 million, compared with $43.6 million for the same period a year ago. Profits were $1.7 million, or 11 cents per share, compared with $400,000, or 3 cents per share, for the second quarter of last year.

American Management Systems, Inc. announced revenue for the first quarter ended March 31 of $31.7 million, compared with $23.3 million a year ago. Profits were $1.1 million, or 21 cents per share, compared with $902,000, or 18 cents per share, in the like quarter a year ago.

Computer Sciences Corp. announced revenue for the year ended April 3 of $1.03 billion, compared with $836.6 million last year. Profits were $32.2 million, or $2.06 per share, compared with $23.9 million, or $1.61 per share, in the previous year.

For the fourth quarter, revenue was $290.5 million, compared with $236.8 million a year ago. Profits were $10.8 million, or 68 cents per share, compared with $8.9 million, or 57 cents per share, in the corresponding period a year ago.

Alliant Computer Systems Corp. reported net income for the first quarter ended March 31 of $2.5 million, or 23 cents per share, after an extraordinary credit of $871,000, compared with net income of $467,000 for the same period a year ago. Revenue was $12 million, compared with $4 million in the first quarter of last year.

Commodore International Ltd. announced revenue of $169.5 million and net income of $1 million, or 3 cents per share, for the third quarter ended March 31. This compares with revenue of $182.3 million and a net loss of $36.7 million for the like quarter last year.

Daisy Systems Corp. reported a net loss of $4.9 million, or 28 cents per share, on revenue of $23.8 million for the second quarter ended March 31. This compares with a net loss of $4.7 million, or 27 cents per share, on revenue of $22.5 million reported for the corresponding period a year ago.

Businessland, Inc. announced revenue for the third quarter ended March 31 of $145.8 million, compared with $100.7 million in the previous year. Profits were $2.2 million, or 9 cents per share, compared with $1.5 million, or 7 cents per share, in the like quarter a year ago.

Massachusetts Computer Corp. reported revenue for the third quarter ended March 28 of $20.3 million, compared with $14.1 million in the previous year. Profits were $1.6 million, or 11 cents per share, compared with $587,000, or 4 cents per share, a year ago.

Wyse Technology, Inc. announced revenue for the fourth quarter ended April 3 of $77.9 million, compared with $46.3 million in the previous year. Profits were $5.1 million, or 41 cents per share, compared with $3.7 million, or 33 cents per share, one year ago.

For the year, revenue was $260 million, compared with $166.4 million in the previous year. Profits were $18.1 million, or $1.50 per share, compared with $12.6 million, or $1.20 per share, reported last year.

Compugraphic Corp. reported revenue of $88.5 million and net income of $2.3 million, or 27 cents per share, for the quarter ended April 4. In the corresponding quarter of the previous year, revenue was $86.9 million and net income was $1.2 million, or 15 cents per share.

Corvus Systems, Inc. announced revenue for the third quarter ended February 28 of $7 million, compared with $9.4 million last year. Net loss was $4.3 million, or 14 cents per share, compared with a net loss of $23.3 million, or 83 cents per share, for the same period last year.

Teknowledge, Inc. announced revenue for the quarter ended March 31 of $15.4 million, compared with $10.3 million last year. Profits were $88,000, or 1 cent per share, compared with $979,000, or 21 cents per share in the previous year.

Scientific Micro Systems, Inc. reported revenue for the first quarter ended March 31 of $24.2 million, compared with $15 million in the previous year. Profits were $500,000, or 6 cents per share, compared with $337,000, or 4 cents per share, in the comparable period a year ago.

Mentor Graphics Corp. reported net income for the first quarter ended March 31 of $4.2 million, or 25 cents per share, a 120% increase over $1.9 million, or 12 cents per share, reported in the comparable period last year. Revenue was $50.5 million, compared with $37.1 million in the previous year.

EXECUTIVE CORNER

Daisy Systems Corp. announced that **Norman E. Friedmann** has been named president and chief executive officer. Friedmann has served as director of Daisy since February.

Harvey C. Jones Jr., former president and CEO, will remain on the company's board of directors.

Stratus Computer, Inc. announced four new vice-presidential positions. Appointed were **Michael J. Grady**, to vice-president of major account engineering; **Gary H. Okimoto**, to vice-president of software engineering; **William J. McBride**, to vice-president of hardware engineering, and **Joseph W. Sullivan**, to vice-president of manufacturing operations.

Mark A. Parrish Jr. has been promoted to the presidency of **National Semiconductor Corp.'s Datachecker Systems, Inc.** subsidiary. Parrish previously served as executive vice-president and general manager of Datachecker.

Corvus Systems, Inc. announced that **Lewis T. Lipton** has joined the company as chief operating officer and president. Lipton has been consulting for Corvus on a variety of operational management issues for the past nine months. Previously, Lipton was president and CEO of Trimedia Corp. in Fremont, Calif.

Lipton will report to **James L. Siehl**, CEO, who has also added chairman of the board to his management responsibilities.

Stephen D. Weinroth has resigned from the board of directors of **Centronics Data Computer Corp.** to spend more time on his principal business duties as a managing director of **Drexel Burnham Lambert, Inc.**

Former vice-chairman **Thomas G. Kamp** has been elected chairman.

Megatek Corp., a subsidiary of **United Telecommunications, Inc.**, announced that **Robert Benders** has been named president and CEO.

Kenneth E. Hendrickson has been appointed to the position of vice-president of **Control Data Corp.** in charge of engineering, large disk division, in the company's Data Storage Group. He had been employed by IBM since 1969.

Rand Information Systems, Inc. announced **F. Richard Sleavin Jr.** has been elected president, CEO and director of the company.

Previously, he served as acting president and CEO at Rand.

Meldon K. Gafner has been elected president and chief operating officer of **Computer Application Systems, Inc.** Previously, Gafner served as president at Integrated Software Systems Corp. in San Diego.

Jack Hugus, president of **Scientific Computer Systems Corp.**, has also been named CEO. Hugus joined the company in 1985 as president and chief operating officer.

Kenneth Ross, former president of Ross Systems, Inc., has taken on the position of CEO of **Rossdata Corp.**, the parent company that oversees management of the two firms.

Richard Giordanella, former vice-president of marketing and sales, has been appointed president of Ross Systems.

Victor Technologies, Inc. has announced that **Al Kraus** has been appointed president and CEO. Kraus comes to Victor Technologies from Victor Micronics, Inc., a subsidiary of Victor Micronics AB in Sweden, recently acquired by Datatronic. He will also continue as president and CEO of Victor Micronics.

Jerome L. Dreyer, former president of ADAPSO, has joined **Federal Sources, Inc.** as vice-president.

Federal Sources was founded in 1984 to provide data processing and telecommunications products and services to the U.S. government and related industry.

Sky Computers, Inc. announced the appointment of **Bruce Rusch** as president and chief operating officer.

Before joining the company, Rusch served as senior vice-president of Symbolics, Inc.

Peter Weber, a 22-year veteran of FMC Corp., has been named president and chief operating officer at **Teknowledge, Inc.**

Weber will be responsible for Teknowledge's day-to-day operations and Teknowledge Federal Systems, Inc.

In 1984, Weber was responsible for the establishment of FMC's Artificial Intelligence Center, which now has 40 scientists as members and is considered to be a leading industrial center of applied artificial intelligence in the U.S.

Control Data Corp. has named **Don Powers** vice-president of research and development for CDC's Computer Systems Division. Powers had worked in high-end processor development with **IBM** for 28 years, most recently as director of laboratory development for its Kingston, N.Y., Data Systems Division.

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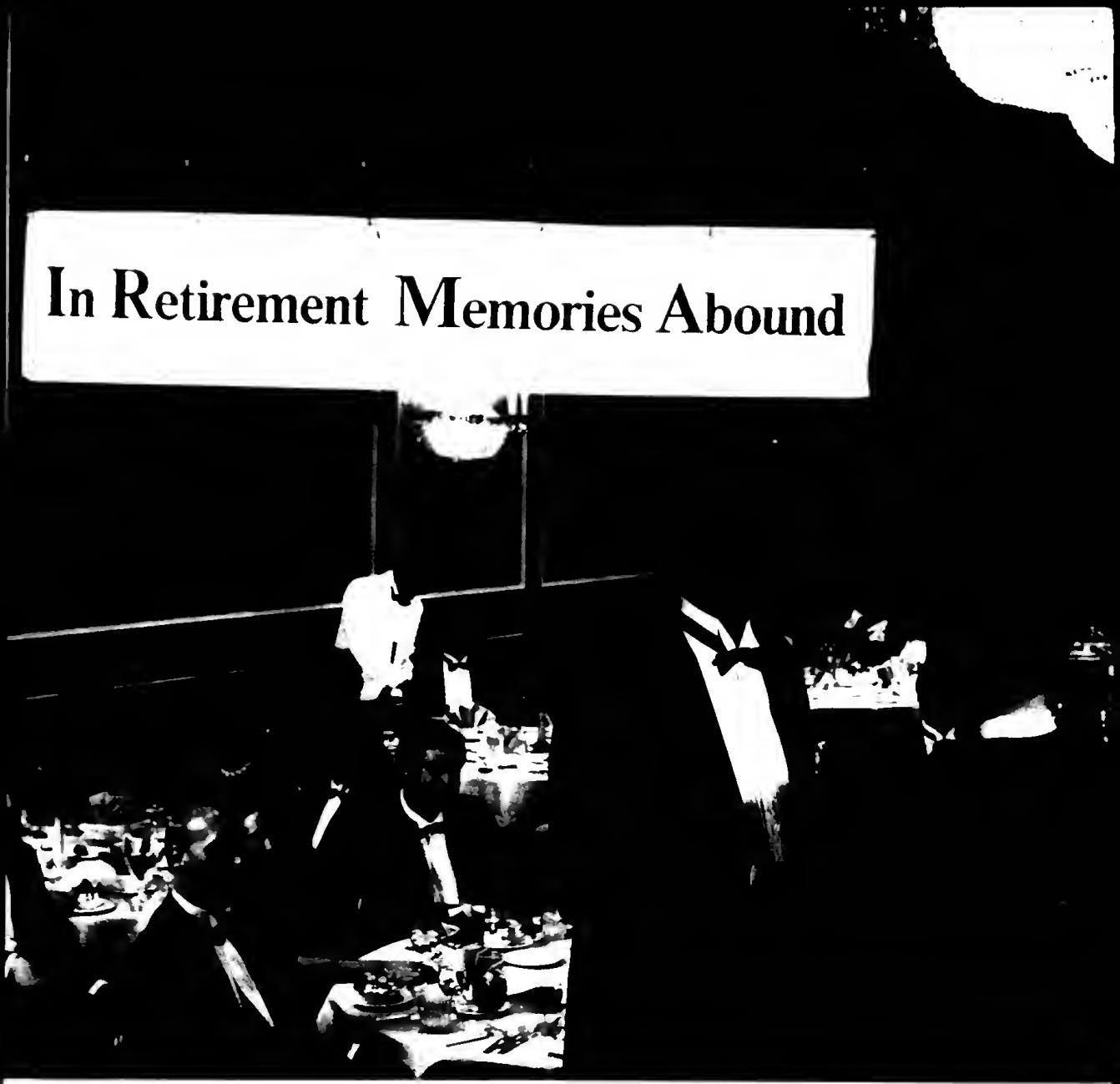

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INS

"THE NETWORK PEOPLE"

An ICOT Company

Dialcom

FROM PAGE 91

wide presence," Winther said.

Dialcom lagged behind the other electronic mail vendors during the mid-1980s, when it was owned by ITT, Winther said.

Dialcom now is tied with Telenet Communications Corp.'s Telemail for fourth place in revenue, with a 9.3% market share.

Major growth in the electronic messaging industry will not come until users view electronic mail as an information utility like the telephone or the photocopier, according to Morris.

Toward that end, Morris said he is eager to develop business alliances with the divested Bell operating companies if the U.S. government allows the phone companies to offer information services via their local networks.

"Dialcom has nothing to lose and everything to gain through relationships with the local Bell operating companies," analyst Winther said. "The telephone company could be an invisible conduit for Dialcom or a reseller or gateway for Dialcom services."

While several electronic mail firms are moving into electronic document interchange (EDI) markets to provide future growth [CW, Dec. 8, 1986], Dialcom is taking a more conservative approach.

Morris said Dialcom will develop basic document-transfer applications using its current products but will create more advanced EDI applications only when there is a real demand from customers.

"One of the problems of this industry has been to build products that then go in search of customers," Morris said emphatically.

"The easiest thing in the world is for technologists to build a product. The most difficult thing is to understand why someone would want it," he added

Industry standards code urged

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Members of the U.S. computer industry have urged Congress to implement a standardized system of codes for identifying the categories of products imported or exported in world trade, a measure the industry members said would save money and improve the accuracy of market statistics.

The Computer and Business Equipment Manufacturers Association (CBEMA) and the American Electronics Association have asked the U.S. Senate's International Trade Subcommittee to join the House of Representatives in supporting the international Harmonized System of product classifications.

"Currently, trade statistics on both imports and exports rely on some guesswork, since not all countries use the same categories or the same measures," explained CBEMA President Vico E. Henriques at a recent subcommittee hearing.

Hodgepodge inflates costs

Furthermore, Henriques said the international hodgepodge of product codes is the primary inflator of company administrative costs for foreign trade.

"Expenses would be dramatically reduced if multinational companies could develop one data base for coding products," he said.

"Currently, companies have to concern themselves with separate data bases for each country with which they trade," Henriques explained

Henriques acknowledged that there will be transition problems with the proposed system, especially since the product codes used in the U.S. and Canada are substantially different from the proposed Harmonized System.

"But those problems should be minimized because of the substantial investment in training already made by the U.S. Customs Service," he said.

Riding the waves of technology

Success in R&D requires skillful navigation of industry trends

BY DENA ALLMAN
SPECIAL TO CW

Lured by the promise of innovative technology, many data processing professionals take positions in research and development not realizing the risks involved.

Although large companies such as AT&T and IBM offer stability, the majority of R&D posts are with small start-ups that are trying to catch the wave of a new technical breakthrough. When the wave recedes or the company fails to effectively navigate competitive waters, researchers can be left high and dry.

"The R&D market is pretty hot, but it calls for people in areas that are also hot," says David Small, president of Scientific Placement, Inc., a Houston-based computer science recruiting firm.

One of the hot areas in today's market is language and compiler development, particularly for optimization and object-oriented technology, Small says.

Companies are also looking for professionals to work with multivendor operating systems, such as Unix.

On the hardware side, companies are seeking people who have worked with the latest micro chips, such as Intel Corp.'s 80286 and 80386, Small adds.

Cooling fields

Artificial intelligence used to be hot, recruiters say, but that field should be approached cautiously today because too many people are specializing in AI.

Computer-aided design and manufacturing is also an exhausted R&D area. There have been fewer advancements in this area in recent years than researchers had expected.

To avoid the risk of picking the wrong technology, R&D professionals can join a large vendor. Many recent college graduates often start in R&D departments at large companies and work there four to five years, Small says.

Rather than build products from scratch, R&D professionals in large organizations generally design new products to enhance the ones the companies already market.

Often, after they obtain experience from large companies, many R&D specialists move on to smaller organizations or form their own companies, where they can be more creative.

Because R&D involves a more in-depth level of work than general DP tasks, employers prefer to hire recent college graduates rather than professionals seeking mid-career moves.

"It is harder to train people who have worked in other areas of DP to do research and development because R&D is very different," says Steve Hannaford, manager of product information at Cricket Software in Philadelphia.

Instead of simple software programming or project management, R&D specialists must develop existing products and make old products better. They are more like scientists than DPers, and they work in an informal environment where teamwork is more important than leadership, Hannaford says.

> R&D specialists must develop existing products and make old products better. They are more like scientists than DPers, and they work in an informal environment where teamwork is more important than leadership.

"An R&D position is crazy and hectic and involves long hours," Hannaford adds. "The burnout rate is higher in R&D than in other areas of DP."

Professionals who have earned advanced degrees in computer science are the most attractive candidates for R&D posts, according to Small.

Credentials requested

"It is a very credentials-oriented line of work, and it is becoming harder for people with a high school education or a small amount of college education to get an R&D job," he adds.

Thomas Shirhall, manager of professional staffing at the Institute for Defense Analysis in Alexandria, Va., a national Defense Department advising firm, says employees with bachelor's degrees require supervision, while staffers with master's or Ph.D. degrees can assume more responsibilities and become specialists in a company's area of interest.

Physicians and mathematicians can also obtain posts in R&D at advanced facilities such as Sandia National Laboratories in Albuquerque, N.M.

"There is always a shortage of people with Ph.D.s in computer science," says Melissa Smartt, a technical staffer at Sandia.

"We work with computations and cryptographic systems, so an educational background in computer engineering, computer science and mathematics is often required," Smartt explains.

Such a background is often essential at Sandia because researchers work closely with engineers in the laboratory, Smartt says.

Where the jobs are

The most opportunities in R&D can be found in the Silicon Valley and Los Angeles area, Boston, New York and Philadelphia, Small says.

R&D firms seek employees through a combination of classified ads, recruiting firms and word of mouth.

They usually pay salaries based on the level of an employee's qualifications. For example, many researchers can start at $35,000 a year if they recently graduated with a master's degree in computer science, while an experienced Ph.D. candidate can start at $45,000 or $50,000 per year.

One of the challenges for R&D professionals, as well as their companies, is to constantly update newly released products to avoid other companies from stealing a march on them.

"There are always companies that imitate the products of other companies. Our job is to make our products better before that happens," Hannaford says.

Allman is a free-lance writer based in Chicago.

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You will help software developers resolve application problems in IDMS, JCL, TSO, SPF and utilities. In addition, you will help identify training requirements and may develop and help support training programs.

Strong IDMS skills a must. Requires a minimum BS and 5 years of progressive experience supporting large mainframe IBM operating systems and data base management systems. Experience in PCs, interactive development tools, fourth generation languages, data communications and project management a plus

Application Development Center Coordinator

You will be responsible for identifying areas of potential productivity improvement for implementing and supporting tools, processes and training aids to improve application quality and reduce development cost and for helping to support the group's project management methodology. Requires a minimum BS and 8 years progressive experience, which must include developing medium to large DBMS (IDMS or IMS) applications in a large IBM mainframe environment. PC experience plus good interpersonal writing and language skills are also necessary. Experience in interactive development tools, fourth generation languages, and data communications a plus

IDMS Database Administrator

Responsible for the design and implementation of IDMS application databases which includes both physical and logical design database performance system migration unload/reload database restructure and technical support for GLOBDL, DCMS and SYSGEN HELP. Provides support to applications staff with coding and troubleshooting problems. Requires a minimum BS and 2 years DBA experience in a large mainframe IBM IDMS environment

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Northern California

UNIX Systems Programmer ($41-01) Major San Francisco Bay Area vendor is seeking 1 NIX Development Engineers. Requires kernal know-edge in Berkeley and AT&T UNIX for this highly visible position. To **$55,000**.

DoD Contracts Awarded—Silicon Valley ($41-02) Positions available in Program Management, Satellite control, mission planning, configuration management, digital signal processing and test and integration. Skills needed are ADA, JOVIAL, C, PASCAL or FORTRAN to be used in a state-of-the art development environment. To **$70,000**.

Product Marketing Manager—Mini/Microcomputers ($41-03) Prestigious nationwide computer vendor in San Jose is looking for an experienced professional to manage the integration of a product from engineering definition through product life cycle and marketing distribution. Experience in marketing a computer product is desired. To **$60,000**

Customer Support Systems Engineer ($41-04) Dynamic, young company located in the San Francisco Bay Area is looking for Systems Engineers to support their banking and insurance clients. Three to five years experience in CICS, IMS-DC in an IBM MVS environment desired. To **$40,000**.

Software Engineer—At Start-Up Opportunities ($41-05) Many positions are available for experienced Software Engineers with back grounds in customer support, knowledge engineering, UNIX internals, LISP or PROLOG, compiler development. Silicon Valley location. To **$100 000**

Programmer/Analyst—IDMS/ADSO ($41-07) Healthcare products company seeks a Programmer/Analyst with two or more years IDMS and ADSO experience. Will interface heavily with users in the development and support of business applications. Silicon Valley location. To **$40 500**

Lead MVS Systems Programmer ($41-08) Software services division of a Fortune 500 firm in Silicon Valley seeks a Systems Programmer with three or more years MVS experience. MVS/XA and VTAM desired. To **$50 000**.

Systems Analysts—IMS DB/DC ($41-09) Major San Jose manufacturer offers high visibility positions with multiple career paths. Several opportunities are available for professionals with four or more years IMS DB/DC and COBOL experience. To **$45,000**

Quality Assurance Project Leaders ($41-10) Premiere data communications/networking vendor seeks Project Leaders for their quality assurance groups. Quality Assurance is the fastest growing department of this Fortune 500 vendor making this an outstanding opportunity for someone with two years quality assurance experience in IBM, SNA and X.25 communications. To **$60 000**

Programmer/Analyst—Management and CICS Training ($31-01) Rapidly expanding San Francisco data processing organization seeks a professional with at least two years of IBM OS/C, COBOL and VSAM experience to work on information systems. Excellent opportunities for advancement. To **$40,000**

Programmer/Analyst—Long-Term Growth Position ($31-02) Major San Francisco manufacturer seeks aggressive, results-oriented individuals with two-o years System 34 or 36, EPG II experience. New system development project offers skill enhancement and promotion potential. To **$42 000**

Programmer/Analyst—IMS DB/DC ($31-04) Major California department store chain offers highly visible and challenging opportunities to professionals with four years structured COBOL and some IMS experience in an IBM/OS environment. Excellent training program. Beautiful suburban San Francisco location. To **$36,000**.

Systems Programmer—Communications, MVS, IMS ($31-04) Leading San Francisco computer manufacturer seeks Systems Programmers with a minimum of two years experience in installation, troubleshooting, and product support of network systems. VTAM, SNA, MVS, IMS, and VM/CMS must have experience in multiple major system products support. To **$60,000**

Oregon

Programmer/Analysts—New Development ($41-01) High-growth Portland manufacturing firm is embarking on a large new development effort to install fully integrated manufacturing and financial applications. Professionals with two or more years experience in applications development with solid skills in CICS, ADSO, IDMS structured programming and COBOL sought. Excellent growth potential. To **$36 000**

Programmer/Analyst—HP3000 ($31-02) Growing software house in low cost of living area has multiple openings for professionals with hospital, laboratory or business experience. Minimum three years experience in HP3000 with PASCAL or FORTRAN, structured methodologies and customer interface skills. Progressive environment with career path to Project Leader. To **$40,000**

Senior Programmer/Analyst—CICS ($31-04) Rapidly expanding, well established firm headquartered in Portland seeks professionals for the design and development of applications to support a variety of applications including distribution, inventory and finance in an on-line, large scale IBM environment. Two or more years of structured COBOL and one year of CICS experience with a data base would be a real plus. To **$36,000**

Applications Engineer—UNIX OS ($31-04) Well-established company for the OEM market which manufactures a 32-bit multi-board computer seeks experienced and innovative individuals to develop operating system drivers, utilities, etc. Campus atmosphere in a high-tech park allows individuals to work in a creative environment. Knowledge of C and UNIX internals. Portland. To **$50 000**

Senior Programmer/Analyst—VAX ($41-05) Newly-created position in expanding firm in Portland to design and develop new business applications in MACRO-11. Opportunities for quick growth to Team Leader in the active and unstructured environment. Three to five years DEC PDP and VAX experience programming in MACRO-11 and FORTRAN. To **$55 000**

Consultants—Big 8 ($41-06) Six+ years of three or more years of large systems experience and project management abilities to develop information systems plans. A college degree and strong verbal and written communications skills are sought. Individual should also have a strong profit orientation. A financial manufacturing, insurance or banking background and an MBA is highly desirable. To **$45 000**

Systems Analyst—Growth to Management ($41-08) Well-established Portland company is seeking an individual with strong verbal and written communication skills as well as structured design techniques to lead special projects in an Analyst role. Initially you will be involved in the conversion projects and will then move to new developments from DEC 20 to IBM 9(XX) under MVS. Four to six years experience as a Programmer Analyst and Systems Analyst in COBOL with one year experience in DL/I desired. Data base experience helpful. To **$36,000**

Washington

Data Base Analyst ($41-01) Seattle office of well-established manufacturing firm is expanding its staff to aid to the company's data base administration. Successful candidate will possess expertise in a major data base management system such as IMS, TOTAL or IDMS. To **$45 000**

Tandem Programmer/Analyst ($41-02) Major Seattle firm is seeking a professional with two or more years experience in TAL, Pathway and COBOL. Banking, financial or data communications experience preferred. Company is situated in a beautiful country setting outside of Seattle. To **$45 000**

Project Leader ($41-03) Seattle-based organization is seeking a proven leader to implement a major on-line CICS/DL/I project. Position is in the retail industry and offers an opportunity for advancement. Must have major project responsibility experience and excellent interpersonal skills. To **$45 000**

Systems Programmer ($41-04) Expanding Northwest firm offers state of the art exposure to an experienced IBM OS Systems Programmer. The successful candidate will join the state industry leader who is enjoying the unique advantages of the Pacific Northwest. CICS, MVS/TSO systems internals desirable. To **$45 000**.

Programmer/Analyst—On-line Development ($41-05) Major Seattle firm is offering the opportunity for solid IBM OS/C, OBOL Programmers to learn both CICS and IMS/DC. Minimum of two years experience desired. Relocation assistance. To **$35 000**

Telecommunications Systems Programmers ($41-06) Large manufacturing firm located in the Pacific Northwest has multiple opportunities in IBM communications systems. Develop, implement and design new on-line IBM ACF/NCP, VTAM/NCP, BTAM, SNA experience helpful. To **$50 000**

Software Engineers—CAD/CAM/CAE ($41-07) Highly successful suburban Seattle-based company which develops manufacturing engineering software products has multiple openings. Background in CAD/CAM, CADAM, CATIA or CAEDS desired with FORTRAN C or PASCAL IBM mainframe. To **$45 000**

Programmer/Analyst ($41-08) Wholesale distributor seeks a senior and junior Programmer/Analyst using RPG III on IBM System 36. Will develop major new systems in all areas of the company. Excellent opportunity to work in a small environment with room for promotion in the suburbs of Seattle. To **$35,000**

COBOL Programmers—IMS DB/DC Training ($41-10) One of the largest employers of data processing professionals in the Seattle area has multiple openings for Cobol or MVS COBOL Programmers with a minimum of one year experience. This firm offers extensive in-house training in IMS DB/DC skills. **$25 000-$50 000**

Senior Big 8 Consulting ($41-11) Join a Big 8 firm which is a leading provider of consulting services in all areas of business in the Pacific Northwest. Person must have at least five years experience in an IBM mainframe environment including CICS, DL/I or IMS DB/DC. Fourth generation languages, micros and structured design techniques are helpful. To **$50 000**

Sales Representative—Earn $100 000 ($41-12) Major software vendor for mainframe and mini-computer sales seeks a professional with a minimum of five or more years of proven sales experience in the hardware and/or software markets. New Pacific Northwest territory. To **$75 000 at 100% of quota**

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PRINCIPAL DESIGN ENGINEER

MS/BSEE 7-10 years experience in micro-processor based design. Intel 8086/80386 experience preferred.

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BSCS/EE 3-7 years experience in real-time programming. Knowledge of military communications, PLM and/or ADA, and MS-DOS preferred.

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Salaries fully commensurate with your background are complemented by an excellent benefits package. If you desire a position of stimulating responsibility that will allow you to maximize the potential of your knowledge and experience, send your resume to: E. Ruikkie, Dept. CW, HONEYWELL DEFENSE COMMUNICATIONS AND PRODUCTION DIVISION, 10901 Malcolm McKinley Drive, Tampa, FL 33612.

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Systems Programmers Financial Services Industry

Mentor Credit Corporation, with corporate headquarters in Norwalk, CT, is a member of the Mentor Financial Group, a nationwide financial services organization serving banking, mortgage and consumer credit customers. Our MIS operation is currently expanding to create a consumer credit utility through the establishment of network-based delivery systems. As part of our technical support team, you will have exposure to all technical facets including operating systems, on-line systems and systems support products. Your present experience with IBM 4300 System, CICS, VTAM, DOS, VSE, VM, CMF, VSAM, BAL and COBOL will prepare you to resolve systems problems and increase D P productivity. We require 3-5 years systems programming experience and support in addition to excellent communication skills. An outstanding compensation package with opportunity for professional development is provided.

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40 hours a week, plus overtime as needed. Salary $30,000 to $32,000. Mail resume to: Employment Security Department, E.S. Division, Attn: AEC #4589B, Olympia, WA 98504.

CONSULTING

Dissatisfied with your current position? Are you a skilled Programmer or Programmer Analyst who is looking for an opportunity to utilize your expertise for greater reward?

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The individual should come from an IBM MVS/XA environment with a minimum of two years in-depth experience in the installation and implementation of MVS and associated control software (JES 2, ISPF/PDF, HSM, RACF, SMP/E, DFP). Additional experience in DOS/BSE conversion to MVS would be a definite plus.

Please send resume and salary history in complete confidence to: **Professional Staffing Department, E. & J. Gallo Winery, P.O. Box 1130, Modesto, CA 95353.**

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SYSTEMS DESIGNER - Formulate logical statements of business & financial problems & devise procedures for solutions of the problems through the use of data processing systems & programming. Prepare charts, tables and diagrams to assist in analyzing problems, utilizing if necessary various business scientific and/or engineering mathematical techniques. Analyze existing system and programming logic difficulties and revise the logic and procedures involved as necessary. Develop logic and procedures to provide more efficient machine operations. Code, debug and document programs. Req'd: Bach. Comp. Sci. or Math w/Comp. Sci. courses, 2 yrs. exp. or 2 yrs. rel exp. Analyst must show demonstrated ability in mathematical techniques used in designing computer systems for financial applications. $36,500 yr. Equator Equitable HCA Corporation, Central Systems Department, 195 Broadway, (FEI) New York, NY 10007. Send resume.

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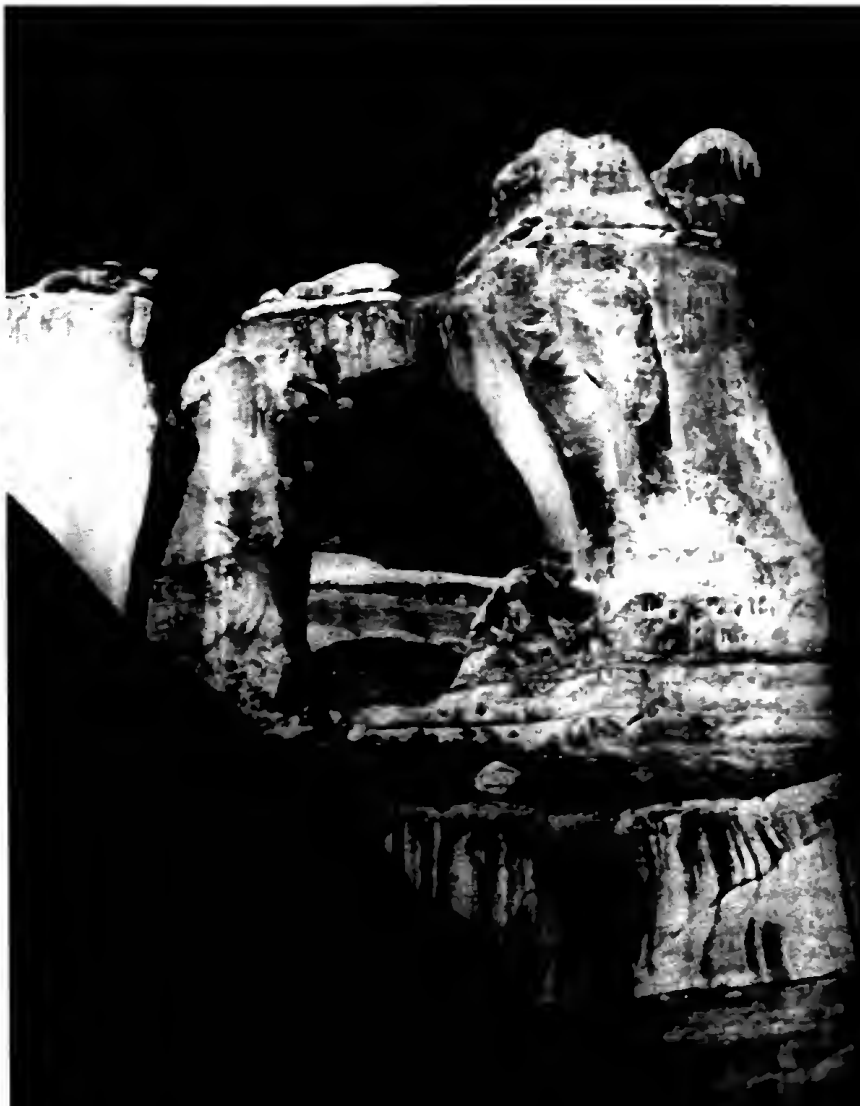

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PROGRAMMERS UNIX* (Languages)

Positions require strong UNIX* background UNIX* V internals preferred. Must also have experience in compiler development, compiler support or software product porting in the UNIX* V environment. Also requires software quality assurance experience for UNIX* based software products.

Positions require 2 years COBOL experience and 1-2 years UNIX* experience. Microfocus, Ryan McFarland, or Philon COBOL experience would be a definite plus.

Positions require 1-2 years RPG experience for System 34/36 along with 1-2 years experience with UNIX* and C language.

UNIX* (Operating Systems)

Positions require strong background in UNIX* operating systems and C language is necessary. Product development experience is desirable. UNIX* internals experience is also helpful.

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Positions require background in UNIX* and C and a knowledge of device drivers. Must have experience in one or more of the following areas: async/sync host communications (e.g. IBM, Sperry, Burroughs), LAN's, Wide Area Networks (PDN/DDN) including protocols such as TP-4, TCP/IP, or ISO/OSI standards.

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— Michael Gill
Senior Vice President
Creative Director
Thompson Recruitment Advertising

Michael Gill is Senior Vice President and Creative Director of Thompson Recruitment Advertising based in Los Angeles California In 1986 Thompson won more EMA awards than its three largest national competitors— combined The company s advertising goal is a simple but demanding one To create the most effective recruitment advertising in the marketplace

Thompson can point to many reasons for its success And one of the first that comes to mind Michael says is Computerworld and its Employment Today section

Today s job market continues to change rapidly It s no longer enough to merely post a job and hope that people will come running This new competitive marketplace demands that we use many new approaches and do a lot more research Simple demographics just aren t enough any more Fortunately Computerworld understands this need for research that goes beyond numbers alone

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Bjorn Nordemo
Vice President
Data Arts & Sciences Inc
Weston MA

Bjorn Nordemo is Vice President of Data Arts & Sciences, Inc (DASI), a contract software agency based in Weston, MA. Although they place people in permanent positions DASI most often places 'contract programming personnel' — consultants who fit special niches for short or long term commitments in corporations in the New England area.

"Our agency specializes in finding computer consultants — designers of systems, evaluators of hardware and software requirements, and computer programmers to mention a few. We recently were introduced to Computerworld as a potential source for finding these consultants states Bjorn. *"I liked the idea because I know Computerworld has a broad reach — from MIS/DP directors to computer programmers in multiple industries and multiple markets — and that's what DASI needs."*

"We had four specific positions for MIS/DP consultants that we needed to fill in northern New England. We used the local newspaper on a weekly basis, but people who are willing to move usually aren't reading the local Sunday paper. So I felt this was a perfect opportunity to try Computerworld." says Bjorn.

According to Bjorn, he's quite satisfied with the results. *"From Computerworld, we filled 75% (3 out of 4) of the positions with the responses from the first week, and the remaining position with the response from the following week. These results alone made my ads in Computerworld worthwhile."*

And Bjorn also recognizes a second benefit to advertising in Computerworld. *"The beauty of using Computerworld is that it's read by people in the computer industry who have a need for consultants, as well as being read by consultants who need to keep up to date on the marketplace,"* says Bjorn. *"So we not only reach qualified candidates to fill our current openings, but we are creating awareness of the services that DASI has to offer,"* says Bjorn.

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IMS ANALYST/PROGRAMMER

This position involves working in an environment utilizing state-of-the-art IMS techniques and high-level languages to develop multi-system interfaces and to provide production support. Requires at least 3 years experience as an Analyst/Programmer, including 2 years of IMS DB/DC designing and coding experience. A working knowledge of OS/UCL and TSO/ISPF is required. PL-1 and/or IMS/ADF experience is a strong plus.

MSU System Services, Inc. is headquartered in New Orleans, LA and has a highly professional MIS group utilizing the least equipment and software. We offer an exceptional relocation package including relocation allowance (one month's salary), paid house hunting trip, paid moving expenses, mortgage interest differential plus interim living expenses.

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National Computer Associates

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Jerry Winfrey, Data Processing Manager
Werner Enterprises Incorporated
PO Box 37308, Omaha, Nebraska 68137

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The qualified applicant must have graduated from a college or university with a Bachelor's degree in computer science or a related field plus five (5) years of experience in systems and programming development with at least three (3) of those years in systems software or an equivalent combination of education and experience. The maximum starting salary of the position is $34,674.00 annually.

Vermillion is located near the Missouri River in extreme southeastern South Dakota, 60 miles south of Sioux Falls, South Dakota and 120 miles north of Omaha, Nebraska.

Application and/or resume must be postmarked on or before June 1, 1987. For more information call Jim Lyodc at 605-677-5047 or send state application form or resume to: University of South Dakota, Personnel Officer, Slagle Hall 207, 414 E. Clark Street, Vermillion, SD 57069.

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For immediate consideration, please send resume to David Armstead, Department CW64, Storage Technology Corporation, 2270 South 88th Street, Louisville, Colorado 80028-3159. We are an equal opportunity employer.

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MSEE degree plus two years' industry experience, much of the experience should have been directly involved in IC development system state analysis using DAISY Megalogician, test, logic design using CSSD and BILBO, hierarchical silicon compiler, supported by programming skills in C and proficiency with digital and analog test vehicles. Significant hands-on industrial experience required in the following areas: designing semi-custom gate array and standard cell VLSI microCMOS parts, employing hardware and gate level simulation, analysis, and debugging with 2901 bit slices and next higher and new processor architecture using Tektronix graphic tech nology, including 3-D, and integrated circuit tech nology fundamentals such as Gallium Arsenide, standard cell, gate array, and packaging and part planning for VLSI.

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Computer Center Director

(Closing date May 31, 1987)

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Associate Research Scientist

The Center for Computer Aided Design of the University of Iowa seeks an experienced Associate Research Scientist to supervise and carry out research and applications in mechanical system dynamics. Applicants must have a Ph.D. degree in Mechanical Engineering with specialization in large scale dynamic system analysis and real time dynamic simulation. At least 2 years experience in large scale dynamic system analysis is required. Salary is in the range of $35,000 to $42,000 per year. Send resume and three letters of reference to Job order no. IA 1696480. Job service of Iowa, 1819 Lower Muscatine Rd., P.O. Box 2990, Iowa City, IA 52244. EO/AAE.

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Strong knowledge of database management systems, structured programming techniques, operating systems and analyzing skills. Develop detailed specifications and write programs from these specifications in PRO/IV. Two years experience in structured programming. Experience in developing PRO/IV applications on VAX a must. Bachelor in computer science. Las Vegas, Nevada company. $27,000/year. 40 hour week. Send resume to: Employment Security Dept., 135 South 8th St., Las Vegas, Nevada 89101, re: Job Order #8671507. Ad paid for by employer.

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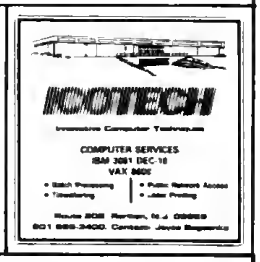

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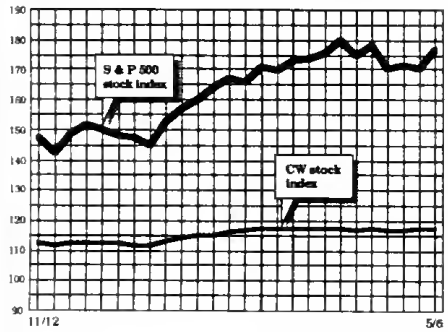

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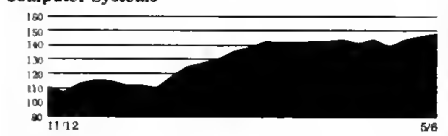

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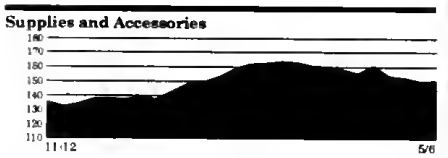

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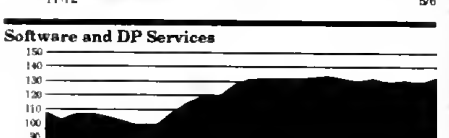

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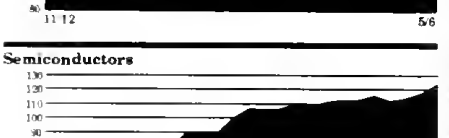

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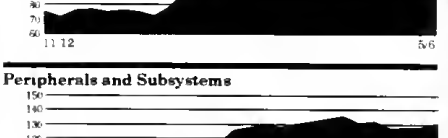
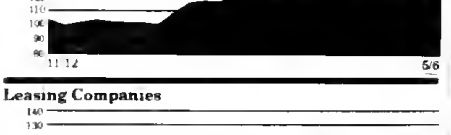


Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 6, 1987

* CLOSE PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
TO NEAREST DOLLAR

Computer Systems

	52 WEEK RANGE	PRICE CLOSE MAY 6 1987	WEEK NET CHNGE	WEEK PCT CHNGE
ALPHA MICROSYSTEMS	4	4 5/8	0	13
ALTOS COMPUTER SYS	4	2 3/8	-1/8	2.1
AMDAHL CORP	42	41 7/8	1/1	2.8
APOLLO COMPUTER INC	24	24 3/8	-2 1/4	13.9
APPLE COMPUTER INC	62	80 1/8	+2 3/8	2.9
AT&T	28	25 7/8	5/8	2.3
BTI CORP	6	3 1/8	3/8	13
COMPAQ COMPUTER CORP	39	38 3/8	7/8	1.3
COMPUTER CONSOLES INC	12	9 1/2	1/2	5.4
CONCURRENT COMPUTER	19	15 1/2	0	0.0
CONTROL DATA CORP	45	33 1/2	1/4	1.5
CONVERGENT TECH	12	6 3/8	1/8	3.8
CRAY RESH INC	136	116 1/2	4 3/8	3.5
DAISY SYS CORP	14	9 1/2	1/2	2.6
DATA GEN CORP	42	31 1/2	1/4	1.2
DATAPOINT CORP	9	4 7/8	1/4	1
DIGITAL EQUIP CORP	125	111 1/8	1/4	0.5
FLOATING POINT SYS INC	4	1 1/8	0	0.0
GOULD INC	28	15 7/8	+1/8	0.7
HARRIS CORP	42	40 1/2	1/2	1.2
HEWLETT PACKARD CO	63	60 1/2	-1 3/4	5.9
HONEYWELL INC	84	56 1/2	1/2	0.6
IBM	156	156 7/8	1 1/2	1.0
IPL SYS INC	4	2 3/8	-1/8	8.1
ITT CORP	66	44 1/2	1/2	0.9
MAI BASIC FOUR INC	4	2 1/4	0	0.0
MATSUSHITA ELEC INDL LTD	19	13 7/8	+1/8	0.9
MENTOR GRAPHICS CORP	14	7 1/2	+1/2	7.1
NBI INC	4	1 7/8	1/8	2.2
NCR CORP		72 1/2	+1/2	0.7
PRIME COMPUTER INC	24	18 3/8	1/8	0.7
STRATUS COMPUTER	38	36 1/8		0.0
SYMBOLICS INC	14	4 3/8	1/4	5.9
TANDEM COMPUTERS INC	15	7 3/4	1/2	6.9
TANDY CORP	35	41 3/8	2 1/4	5.7
TEXAS INSTRS INC	203	89 1/2	1/2	0.6
ULTIMATE CORP	35	24 1/2	+2 3/8	13.2
UNISYS CORP	175	21 1/2	1/2	2.4
WANG LABS INC B	19	19 3/8	-1/4	1.3
WANG LABS INC C	19	18 1/2	1/4	1.4
XEROX CORP	68	49 3/4	-1 3/8	2.6

Supplies & Accessories

	52 WEEK RANGE	PRICE CLOSE MAY 6 1987	WEEK NET CHNGE	WEEK PCT CHNGE
AMERIBUSINESS PRODS	36	26 1/2	1/4	0.9
BARRY WRIGHT CORP	24	14	1/4	2.9
DATAPREP PRODS INC	13	11 1/2	0	0.0
EVANS BUSINESS FORMS INC	23	13	-1/2	3.7
3M CO	140	98	3	4.3
MOORE LTD	44	30	1/4	0.8
STANDARD REGISTER CO	63	32	3/4	2.3
WALLACE COMPUTER SVCS	41	31	1/4	0.8

Software & DP Services

	52 WEEK RANGE	PRICE CLOSE MAY 6 1987	WEEK NET CHNGE	WEEK PCT CHNGE
ADVANCED COMPUTER		14 1/2	1/2	2.8
ADVANCED SYS INC		8 1/2	1/2	4.9
AGS COMPUTERS IN	54	43 1/2	3/4	8.0
AMERICAN MGMT SYS IN	28	27 1/2	1/8	2.4
AMERICAN SOFTWARE	16	16 5/8	1/8	10.4
ANACOMP INC		5 1/2	0	1.7
ANALYSTS INT'L CORP		10 1/2	1/2	2.4
ANSON STATE		6 1/2		3.2
ASK COMPUTER SYS IN		4 1/2		1.1
ASTRADYNE COMPUTE		3 1/4	1/4	4.5
AUTOMATED DATA PROC		44 1/2		2.4
BOLLE & BABBAGE IN		14 1/2		2.4
COMPUTER ASSOC INT		68 1/8	3/8	6.0
COMPUTER HORIZONS CP		3 1/2		
COMPUTER NETWORK TECH		5 1/2	1/2	6.5
COMPUTER SYS ENGRS		5 1/2		1.1
COMPUTER TASK GROUP IN				4.3
COMSHARE INC			1/2	6.3
CULLINET SOFTWARE		10 1/2	1/2	5.4
DATAPOINT CORP		4 1/2	1/2	5.2
DELPHI RESEARCH INC		2 1/2		
DELTA DATA SYS CORP		2 3/4	1/4	10.0
DIGITAL SYS CORP		2 1/4		6.9
EDP SERVICES OF AMER		1 1/2		0.0
EDUTRONICS SYS CORP		1 1/2		0.0
EFFECTIVE MGMT SYS		1 1/2		0.0
EMPIRE OF AMERICA		1 1/2		0.0
ENTERPRISE SYS CORP		1 1/2		0.0
EXECUTIVE COMPUTER		1 1/2		0.0
FOCUS SYS INC		1 1/2		0.0
GENERAL AUTOMATION		1 1/2		0.0
GENERAL DATACOMM IND		1 1/2		0.0
GENERAL ELECTRIC CO		1 1/2		0.0
GENERAL MOTORS CORP CLASS E		43 5/8		1.2
HOGAN SYS INC		1 1/2		0.0
INFORMATION SCIENCES		1 1/2		0.0
INFOTRON SYS CORP		1 1/2		0.0
INTEGRATED		1 1/2		0.0
INTERACTIVE SYS INC		1 1/2		0.0
LOTUS DEVELOPMENT CORP		1 1/2		0.0
MANAGEMENT SCIENCE AM		1 1/2		0.0
MCAUTOMATION INC		1 1/2		0.0
MICROSOFT CORP		1 1/2		0.0
MICROPRO INTL CORP		1 1/2		0.0
MICROSOFT CORP		1 1/2		0.0
NATIONAL DATA CORP		1 1/2		0.0
ON LINE SOFTWARE INT		1 1/2		0.0
ORACLE SYS CORP		1 1/2		0.0
PANSOPHIC SYS INC		1 1/2		0.0
PEOPLE MGMT SYS CORP		1 1/2		0.0
PROGRAMMING & SYS INC		1 1/2		0.0
REYNOLDS & REYNOLDS		1 1/2		0.0
SCIENTIFIC COMPUTERS IN		1 1/2		0.0
SOFTWARE AG SYSTEMS		1 1/2		0.0
SOFTWARE PUBLISHING		1 1/2		0.0
STERLING SOFTWARE INC		1 1/2		0.0
SUNGARD DATA SYSTEMS		1 1/2		0.0
TCF CORP		1 1/2		0.0
TRW INC		1 1/2		0.0
UNISOFT WARE IN		1 1/2		0.0

Semiconductors

	52 WEEK RANGE	PRICE CLOSE MAY 6 1987	WEEK NET CHNGE	WEEK PCT CHNGE
ADVANCED MICRO DEV		1 1/2		0.0
ANALOG DEVICES INC		1 1/2		0.0
ANALOGIC CORP		1 1/2		0.0
APPLIED MAGNETICS CORP		1 1/2		0.0
AVANTEK IN		1 1/2		0.0
BADGER INC		1 1/2		0.0
CYPRESS SEMI		1 1/2		0.0
MICRO MASK		1 1/2		0.0
MOTOROLA INC		1 1/2		0.0
NATIONAL SEMICONDUCTOR		1 1/2		0.0
TERADYNE IN		1 1/2		0.0

Peripherals & Subsystems

	52 WEEK RANGE	PRICE CLOSE MAY 6 1987	WEEK NET CHNGE	WEEK PCT CHNGE
AM INTL INC		1 1/2		0.0
ANDERSON JACOBSON IN		1 1/2		0.0
ASTRESH INC		1 1/2		0.0
AUTOTELCOMP		1 1/2		0.0
AVANT GARDE COMPUTING		1 1/2		0.0
BAY TEC INC		1 1/2		0.0
BOLT BERANEK & NEWMAN		1 1/2		0.0
CETEC CORP		1 1/2		0.0
CMN TRONICS CORP		1 1/2		0.0
COMPUGRAPHIC CORP		1 1/2		0.0
COMPUTERVISION CORP		1 1/2		0.0
CONRAC CORP		1 1/2		0.0
DATAPRODUCTS CORP		1 1/2		0.0
DATARAM CORP		1 1/2		0.0
DATA WHT H CORP		1 1/2		0.0
DATUM INC		1 1/2		0.0
DIVISION INDS CORP		1 1/2		0.0
ENDATA INC		1 1/2		0.0
EMC CORP		1 1/2		0.0
EVANS & SUTHERLAND		1 1/2		0.0
FLOATING POINT SYS INC		1 1/2		0.0
GANDALF TECHNOLOGIE		1 1/2		0.0
GENERAL DATACOMM AD		1 1/2		0.0
GLOTEL CORP		1 1/2		0.0
INFORMATION INTL IN		1 1/2		0.0
INTERLEAF INC		1 1/2		0.0
MEGADATA CORP		1 1/2		0.0
MSI DATA CORP		1 1/2		0.0
NASHUA CORP		1 1/2		0.0
NETWORK SYS CORP		1 1/2		0.0
NORTH AMER PHILIPS CORP		1 1/2		0.0
NORTHERN TELECOM LTD		1 1/2		0.0
NOVELL INC		1 1/2		0.0
PARADYNE CORP		1 1/2		0.0
PERIPHERAL CORP		1 1/2		0.0
PLESSEY PLC		1 1/2		0.0
PRINTRONIX INC		1 1/2		0.0
QMS INC		1 1/2		0.0
RAMTEK CORP		1 1/2		0.0
RECOGNITION EQUIP INC		1 1/2		0.0
SCAN TRON CORP		1 1/2		0.0
SCIENTIFIC ATLANTA IN		1 1/2		0.0
SEAGATE TECHNOLOGY		1 1/2		0.0
STORAGE TECHNOLOGY		1 1/2		0.0
SYS MICROSYSTEMS INC		1 1/2		0.0
T BARNEY		1 1/2		0.0
TAB PRODS CO		1 1/2		0.0
TANDON CORP		1 1/2		0.0
TEC INC		1 1/2		0.0
TEKTRONIX INC		1 1/2		0.0
TELEVIDEO SYS IN		1 1/2		0.0
TELEX CORP		1 1/2		0.0
TIMEPLEX IN		1 1/2		0.0
TITAN CORP		1 1/2		0.0
WYSE TECH		1 1/2		0.0

Leasing Companies

	52 WEEK RANGE	PRICE CLOSE MAY 6 1987	WEEK NET CHNGE	WEEK PCT CHNGE
COMDISCO INC		1 1/2		0.0
CONTINENTAL IS		1 1/2		0.0
FINANCO CORP		1 1/2		0.0
PHOENIX AMER IN		1 1/2		0.0
SELECTRON INC		1 1/2		0.0
TI LEASING		1 1/2		0.0

** NEW YORK & AMERICAN, P PACIFIC, B BOSTON, C NATIONAL, M MIDWEST, O OVER THE COUNTER, $ SPLIT

Microsoft rockets

Soars with 13¼-point gain in strong week for industry

Few investors are happier than those who bought shares of Microsoft Corp. at its initial public offering price of 19.

The Redmond, Wash.-based software success story shattered more barriers last week, vaulting 13¼ points in four days of over-the-counter trading to a staggering new high of 118¼. The lion's share of that rise, 8¾ points, came on Tuesday, when the Dow Jones industrial average gained 51 points, its fourth largest one-day increase.

It was generally a strong week for software and services stocks. Firms posting new highs on the New York Stock Exchange Thursday included Computer Associates International, Inc., up 2¼ points in four days to 49½; and AGS Computers, Inc., up 2¾ points to 43¾.

Other software-and-services gainers included Electronic Data Systems Corp. (General Motors Corp.'s Class E stock), up 2⅝ points to 43⅜; Uccel Corp., up 1½ points to 34; and Management Science America, Inc., up ⅞ of a point to 13½.

Among the blue chips, IBM was up 4½ points to 164⅞, but Digital Equipment Corp. dropped 2¼ points to 170¼.

CLINTON WILDER

IBM response to Amdahl MDF expected

BY JEAN S. BOZMAN
CW STAFF

In response to user demands for greater flexibility in systems management, IBM is reportedly readying its answer to Amdahl Corp.'s Multiple Domain Facility (MDF).

The answer, part hardware and software for the IBM 3090 mainframe series, is expected soon by industry analysts, who say they view it as a logical extension of IBM's VM/XA operating system. The anticipated product, called by some the Processor Partition Facility, would arrive about two years after Amdahl first shipped its MDF product for the Amdahl 580 series in the second quarter of 1985.

"You can run partitions on a VM machine now, but they're just not that efficient," says Dale Kutnick, executive vice-president of research for the Gartner Group, Inc. in Stamford, Conn. "Right now, you can get 45% to 80% of capacity on guest systems running under VM, but with Amdahl's MDF, you can get performance of up to 90% or more."

IBM's planned product would be built on the same concept as MDF, Kutnick says, but might differ in design and implementation. As many as four partitions would be made available, Kutnick says, adding that it is possible that more could be added later on. No anticipated price range was given, but shipments probably would not be immediate. Some industry analysts predict that the product might not be available for six to eight months.

"Our sense is that IBM will be making several major VM announcements in May and June," says Peter Levine, a vice-president at the Gartner Group who specializes in IBM software systems. "There will be several pieces to the VM announcements, and they will address different markets." Among these could be the partitioning capability of VM/XA as well as a 31-bit version of VM/XA with support for IBM's 31-bit Conversational Monitor System, he adds.

> "THERE WILL be several pieces to the VM announcements, and they will address different markets."
>
> PETER LEVINE
> THE GARTNER GROUP, INC

IBM's solution is expected to substitute microcode for thousands of lines of code in the VM/XA operating system. The microcode in MDF handles much of the operating system's instructions for I/O and device drivers, and IBM's product should do the same. The microcode approach sharply reduces software overhead, allowing applications to run in native mode on high-speed processors.

"The efficiencies are significant," says Romney White, president of VM/CMS Unlimited Inc. in Dorchester, Mass. "If you're running a 15 million instructions per second (MIPS) processor with 10% of overhead, you're losing 1.5 MIPS just to support the operating system."

What MDF does, White says, is assign regions of computer resource to a given operating system running as a guest under VM. In this way, several guest operating systems can be run side by side in the same machine. For example, MDF allows users to run MVS/XA alongside MVS and Amdahl's own UTS Unix mainframe software. Such a partitioning scheme divides a single mainframe into several virtual machines, each running its own operating system and applications.

Analysts have provided few details of the IBM partitioning product, but say competitive pressures should force IBM to provide the same sort of functionality that MDF supplies. "MDF is a big feature for users," White says. "It is helping Amdahl sell machines. Amdahl offers slightly better price/performance than IBM, but that alone does not cause people to leap from the IBM fold. They got the users' attention, though, when they provided a better way for users to manage their system."

"It was just a question of time before IBM caught on," notes Bob Djurdjevic, president of Annex Research, Inc., a Phoenix market research group. "Amdahl has found that the addition of MDF increased the residual values of its older 580 and 5860 machines and, evidently, IBM would like to do the same thing for its 3080s and 3090s."

4381

FROM PAGE 1

have not been formally announced.

Currently, the 4381 line ranges from the Model 11, which performs 1.5 million instructions per second (MIPS), to the 6 MIPS Model 14. The 3090 line begins with the low-end 3090 Model 150E, which performs 10.1 MIPS.

Another user, now employing a 4381 Model 14, said he recently migrated to that machine, having been assured that a more powerful 4381 model would be forthcoming.

"From what I can gather, it will be sometime this month," he said, adding that it most likely will be in the next two weeks.

Sooner than expected?

Although he had previously anticipated a performance boost within several months, he recounted that an IBM representative, on a recent visit, said the announcement would be made "sooner than you think."

The user also said he anticipates the announcement could be made concurrently with the announcement of a new low-end 3090 machine that will overlap the MIPS rating of the new high-end 4381. He said IBM officials have strongly suggested to him that a low-end 3090 is coming.

Bill Husband, a senior consultant with Meridian Leasing in Deerfield, Ill., predicted that IBM will announce an 8 MIPS machine in the 4381 family but will also announce a low-end 3090 with the same capacity. He said it would be logical to expect the 4381 announcement soon, because an IBM trade-in option designed to encourage 4341 and 4361 users to upgrade to a 4381 expired at the end of April.

Under the program, users could migrate to a 4381 at a reduced rate. With the incentive program out of the way, the path would be cleared to introduce a machine offering superior performance to the 4381, Husband said.

'Around the corner'

"It's got to be just around the corner," another user said. "I know a lot of people are being maneuvered [by IBM] to look at their next order placement," he added, pointing out that IBM will generally make it easier for those who have already placed orders for processors to change their order. Smith said he would welcome such an addition because it would add another two to four years to the life span of the Model 13 and Model 14 he now operates.

Dan Folk of U.S. Borax and Chemical Corp. in Los Angeles, who went to IBM's recent annual executives' conference in Palm Springs, Calif., said IBM told customers there that it would add a performance kick to the 4381.

And at a recent IBM-sponsored meeting for industry analysts in Phoenix, IBM indicated that 4381 developments could be expected. "They [IBM] hinted at a new 4381 and said the 9370 would not eat into the 4381 performance range," said George Colony, president of Forrester Research, Inc. in Cambridge, Mass. Industry analyst Dale Kutnick of the Gartner Group, Inc. in Stamford, Conn. concurred that a 15% to 20% power boost for the 4381 can be expected soon.

Early OS/2

FROM PAGE 1

PC-DOS and Microsoft's MS-DOS at least twice as slow as they would under those two operating systems. Microsoft admitted this would be the case even before the program was announced.

Frankston and others noted, however, that Microsoft should have little trouble tightening the program's code and that there are standard programming techniques available to improve its speed and performance.

"A lot of what is slow can be replaced," Frankston said. "If its file system is slow, you can speed it up with caching — or you can make better use of the internal memory structure to keep track of files so you don't have to go out to disk every time."

While several features of the program have to be fine-tuned, developers said they were impressed with the performance of others, such as the dynamic linking which plays an important role in linking the operating system and the applications, and the operating system's ability to utilize the hardware's segmentation facilities.

"It's also nice to see that they aren't trying to create a Unix clone," one developer said.

Corporate developers can obtain a copy of the program by attending one of two developers' conferences. Microsoft will be sponsoring. The first conference is set to be held in Seattle June 2-4 with the second slated for New York July 7-9. In February, Microsoft said it planned to release the developer's version in August.

The program, which includes Microsoft's local-area network manager, C compiler, macro assembler, graphical programming interface, sample code libraries and debugging tools as well as free telephone support for a year, will reportedly cost developers $3,000.

Some developers complained that Microsoft's fee for the program was too steep but others said they felt it was a bargain, noting that if the individual components were sold separately at retail, they would be worth more than $3,000.

Some developers said they believe Microsoft should hold back on widespread availability of the program until it is enhanced, because many developers not experienced with early versions of operating systems would take a negative view of the product and impede its momentum.

"There are problems with early [versions] of operating systems, and if people aren't familiar with those issues, they'll get a negative initial impression," one developer said.

Even if Microsoft makes an improved version available in June, some developers said they plan to concentrate more on enhancing programs compatible with existing versions of MS-DOS. They said the vast majority of users are interested in improving their existing applications rather than exploring the possibilities offered by MS OS/2.

"Most users don't care about MS OS/2 now. For them, it comes down to multitasking in a slower environment or more speed with what they have under DOS," one developer said. "Ninety percent of our customers prefer the latter."

Developers trying to decide whether to make MS OS/2 a priority should ask themselves if they merely want to port an application over to a new operating system or whether they want to fully exploit the advantages of the new environment, according to one observer.

"Vendors that have applications under several environments see this [MS OS/2] as just another port. But others will want to know everything there is to know about it and make the most of it," one developer said.

MS OS/2 - List of features

CW ILLUSTRATION

3Com launches 3+ network tool for Mac

BY PATRICIA KEEFE

SANTA CLARA, Calif. — 3Com Corp., which has been racing with rival Novell Inc. in Orem, Utah., to deliver network software compatible with Apple Computer, Inc.'s Macintosh, said recently it will ship the first phase of 3+ software for the Macintosh in the third quarter.

3+ for the Mac goes into five beta-test sites on July 1. It will allow IBM computers and compatibles on an Ethernet or token-ring network to exchange files with Apple's Macintosh family.

3+ for the Mac will cost the same as the IBM Personal Computer version. Pricing for 3+Share for one to five users is $1,050. Adding a second version for the same price provides unlimited use. 3+Mail for one to five users is $495. 3+Route, or interworking, costs $1,250 and is licensed on a per-server basis. 3+Netconnect, which allows users to transparently link two dissimilar networks, costs $1,250 for Ethernet or token-ring users.

INSIDE LINES

Wall Street fever in Dayton. NCR recently fired 13 employees for what it called activities inconsistent with corporate policy. A source with close NCR ties said the action stemmed from stock trading on inside information, but the company refused to comment on that charge, citing the privacy of the individuals involved. NCR said that none of the dismissed employees were upper management and that their activities had "insignificant" financial implications.

Sheldon's march from the South. The Interface Group's Comdex/Spring '88 will be held next April at McCormick Place in Chicago, company Chairman Sheldon Adelson said last week. After five years, including 1987, of hosting the spring event in the Peach State, Adelson said, "We ran out of space in Atlanta and felt it was time to start moving the show around. We may go back to Atlanta on an every-three-year basis. We're not abandoning Atlanta."

Watching the Next dawn. Sun Microsystems is reportedly readying for announcement later this year a reduced instruction set computing workstation that can process at a speed of 10 million instructions per second and costs around $50,000. Could be that Sun is gearing up for competition from Steve Jobs' new company, Next, Inc., which is said to be preparing a high-speed engineering workstation aimed right at Sun's market.

Could Texaco move this fast? The fate of Lisp Machine, Inc. will be decided next week by a U.S. Federal Bankruptcy Court in Boston. As of this week, DG is the only company that has made an official bid for the artificial intelligence systems vendor, although Lisp Machine is negotiating with "several others," according to a company spokesman. Meanwhile, Ward MacKenzie, former Lisp Machine president, has accepted a post at DG in which he will head up a new value-added reseller (VAR) division. The VAR division combines marketing and development efforts, which had previously been separate operations. DG recruited ex-DEC executive MacKenzie at the time Lisp Machine was filing for bankruptcy in March.

Olsen-net enhancements. The first meeting of Manufacturing Automation Protocol (MAP) users since DEC stirred up a controversy is scheduled for this week in Pittsburgh, and both sides will have the chance to speak their minds. The controversy stems from a number of anti-MAP pro-Decnet remarks made by DEC's Ken Olsen in recent weeks. DEC will likely clarify Olsen's remarks when one of its vice-presidents presents the keynote address to MAP users. Meanwhile, GM has planned a press conference with MAP vendors following the keynote in order to, among other things, "respond to Ken," an Industrial Networking, Inc. spokesman said.

McGowan update. MCI Chairman William McGowan's recent heart surgery was actually a heart transplant, the company confirmed last week. The disclosure indicates that McGowan will not be able to return to work for many months, if at all. Presbyterian-University Hospital in Pittsburgh said McGowan was making steady progress in recovering from the April 25 transplant. Retired President V. Orville Wright will continue as MCI's acting chief executive officer.

Unix, or will you nix? Altos Computer Systems reportedly will be unveiling its multiuser Unix 80386-based system next month. Targeted for value-added resellers, the system should host at least 30 users. It is believed that prices will begin in the $30,000 range. Unlike Prime's new 80386-based multiuser Unix system, the Altos machine will not have the added capability of running Microsoft's MS-DOS.

Perfect timing. Wordperfect, which makes the top-selling word processing package of the same name, is putting the finishing touches on a multifunction program called Wordperfect Executive. Scheduled to be available at its Comdex/Spring '87 introduction next month, the IBM Personal Computer-compatible package includes word processing, a spreadsheet, data management and a calendar.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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